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Editor:
E. C. TUBB

Art Editor:
E. L. BLANDFORD

Cover by:
E. L. BLANDFORD

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Editorial

OUR COVER THIS MONTH DEPICTS THE SURFACE OF VENUS and is, of course, quite imaginative. As yet, we do not know what the surface of Venus is like, and we will never know until we have penetrated the immense cloud-layer which has given the second planet from the Sun its air of mystery. Venus, the Veiled Planet, is truly named. We can see it, we know it exists, we can even make tentative measurements, but just what lies beneath the clouds we do not know. In this, Venus has an analogy much nearer home; intelligence.

Intelligence is an odd thing. We know that it exists, there have been attempts made to measure it, and yet just what it is remains open to doubt. I say "attempts" have been made to measure it, because no one has yet devised a system by which any one man can determine the true intelligence of any other living creature. What actually happens is that the investigator first sets up his own standards of what he is pleased to call intelligence and then measures the subject against those standards.

The trouble is in that those standards are arbitrary, and the intelligence quotient tests, or I.Q., can only measure a person's capabilities against what some other person thinks the subject should know. An I.Q. is determined by dividing a person's mental age by his chronological or actual age and multiplying by a hundred. A four year old child, with a mental age of five would, therefore, have an I.Q. of 125. A thirty year old man, with a mental age of fifteen, would have an I.Q. of 50. But there are many extremely brilliant fifteen-year-olds and, if their capabilities were taken as the standard, would the thirty-year-old man be so unintelligent? And, on the face of it, he would be of a lower grade of intelligence than the four-year-old subject, with an I.Q. of 125.

A dictionary definition of intelligence is the ability to learn and know. Learn and know what? And how can you

measure ability if you don't know just what the subject is able in? And it is impossible to measure anything until you have first set up a standard to serve as a reference. As things are, it would be possible to prove that any subject has either a low or a high I.Q. merely by adapting the standards of measurement to suit the subject.

Let us assume that intelligence is determined by the ability to survive. It is a fair assumption, because it doesn't matter how clever you are, that cleverness is valueless unless you can use it to remain alive. Knowing by heart every word Shakespeare ever wrote may make a man an authority on Shakespeare, but it wouldn't help him to trap game, start a fire by rubbing two sticks together, or fill his stomach when hungry. An aborigine may not be able to read a single word, but he will live where more "intelligent" people will die.

Standards of intelligence, then, must vary according to the society in which the subject lives. An aborigine wouldn't get very far in a city where his particular intelligence is of no use to him. The real basis of measuring a person's intelligence could be stated as the ability to survive in his particular culture. The higher the technological culture the less essential it becomes for a man to be "intelligent" in matters of hunting and trapping game, tanning skins, making weapons, etc.

Intelligence is the ability to learn. There is a difference between the storing of facts and the ability to use those facts. A machine can store facts, but no one claims that a machine is intelligent. A man who merely knows a lot need not be intelligent; he could have an extremely retentive memory and the ability to read.

Primitive societies usually respect those who are strong and are good providers, and in this they are logically correct. Strength means personal survival, and a man who can provide plenty of food adds to that survival factor by being able to support a large family with his inherited characteristics and, through them, the survival factor of the race as a whole. So, the warrior-hunter is respected as a means of racial survival.

Who takes his place in our culture?

E.C.T.



THE PROBLEM WAS APPARENTLY SIMPLE; TO MAKE THE PRISONER TALK. BUT THERE WERE COMPLICATIONS

AT THE AGE OF FIFTEEN, FRED YENDLE DONATED TEN dollars to the Aid-Russia Fund and lived to regret it.

The fact was brought up as evidence against him five years later, when he was expelled from college. The reason for his dismissal was that he had been reading subversive literature; he had borrowed *Das Capital* from the school library. The book, among others, was later withdrawn to save others from temptation, but by that time Fred had become mixed up with an abortive world peace movement whose membership consisted of equal parts of fellow travellers, intellectual communists and idealistic adolescents. He resigned after a few months, sick of the one-sided propaganda, but that didn't help him when he applied for security clearance so as to take up a minor post with the government.

The investigators turned him down flat, branded him as a suspected subversive and effectively damned him.

At the age of twenty-five he had married, a marriage which produced no children, no happiness and a divorce after eighteen months. Ten years later he was dismissed from his job as a clerical worker attached to a firm contracting for the government. He had worked in the same job for twelve years, handled nothing even remotely connected with defence, and so appealed to his union. The union held an inquiry, discovered that Fred had been discharged because he was considered a bad security risk, and promptly expelled him from the union. He appealed, the appeal was thrown out of court, and the costs effectively ruined him.

The next fifteen years followed the pattern in ever decreasing circles. Security had damned him, and Security, in importance, had become second only to God.

At the age of fifty, Fred Yendle arrived in Alamushta with six hundred dollars, a three-day beard and one small suitcase.

He was a slight man, his shoulders stooped, his eyes weak, his suit baggy. He walked along the platform, the suitcase pulling him down one side, and his thin hair blowing in the desert wind. To most people he was a mild, inoffensive, rather pathetic figure. To the Security cop he was something to justify his existence. He stepped forward and barred Yendle's passage.

"All right, you. What have you got in that suitcase?"

"What?" Fred halted. "Nothing much, just a few samples."

"Open it up."

"Why should I?" Fred took a tighter hold on the case. "I'm doing no harm, just walking towards the rest room. No harm in that, is there? It's a free country, isn't it?"

"Sure," said the cop. "And we want to keep it that way. Now open up or I'll run you in."

"What for?"

"Hampering Security in the course of its investigations," said the cop shortly. "I want to see what's in that case."

Fred hesitated, then, setting down the case, snapped the catches and opened the lid. "I'm a traveller in electronic equipment," he said. "Transistor radios and tape recorders. This is a universal tape recorder. It will record, play back, sound-mix and blend at various speeds. The price is . . ."

"Save it," snapped the cop. He stared at the neat layout in the case. Suspiciously, he turned a switch, listened to a burst of music, turned another and heard a business man dictating a letter.

"I've got it loaded with tapes for demonstration purposes," said Fred. He rubbed at his chin. "I want to leave it here while I get shaved and cleaned up ready for an interview." He looked at the cop. "Can I go now?"

The Security cop nodded. He had no Geiger, no specialised knowledge, and thought, like most people, that an atom bomb was something as big as a ten-ton truck.

Fred shut the suitcase, picked it up, continued his journey to the check-baggage section of the station. He inserted coins into a locker, opened it, put the suitcase into the metal cubicle, set the combination lock and slammed the door. He had paid for two days. At the end of that time, unless he either inserted more coins or removed the case, the locker would open and the contents be removed to the general depository.

He wasn't worried; two days was just one day more than he wanted.

Three hours later he was over four hundred miles away, at an airport waiting for a plane to take him over the border. There was a three-hour delay in the flight, and to kill time he entered the bar. He was sipping his third whisky sour when two men, dressed alike in slouch hats, raincoats and dark suits, walked up to him.

"Yendle, Fred Yendle?"

"That's right." To deny it was useless. Everyone carried identification in these days. He produced his without being asked and handed it over. "Police?"

"Security." One of the men glanced at the identification, nodded and took Fred's arm. "You're the man. Come along with us."

"Why?" Fred knew, but something within him caused him to hang back. "What do you want me for?"

"You're under arrest."

Yendle laughed.

Doctor John Evans was listed as Civilian Expert, Interrogation Corps, and so was important enough to be flown fifteen hundred miles, but not important enough to be transported by military aircraft. He sat next to the window

of the big skyliner, a young-old man, his hair shot with silver, his soft brown eyes seemingly capable of holding an infinite understanding. The receiver of a playback was clipped to his ear, the thin wire running to the tape recorder resting on the vacant seat beside him and a heavy file of papers flattened his knees. Work and sleep were two things he just couldn't seem to fit within the twenty-four hours of each day. Usually sleep suffered.

The whispering voice in his ear stopped and he removed the receiver, made a note in his file, closed it and stared out of the window. Beneath him, the moving panorama of fields and roads, houses and small towns, hills and valleys made the countryside seem remote and almost toylike. He found little to interest him in the view; his journey would last three hours and he had tired of it before it was a third over.

The stewardess, young, eager, artificially fresh, came down the aisle and halted beside him.

"Comfortable, sir?"

"Yes, thank you." John glanced at her, recognising the routine behind the apparently sincere desire to please.

"Is there anything you require?"

"I don't think so." John glanced through the window and felt a devil stirring within him. He pointed to where a pair of swollen-topped towers reared above a cluster of concrete buildings. Even from this height it was possible to see the fence surrounding the entire area. "What are those buildings?"

"I'm afraid I don't know, sir." She hadn't looked out of the window. "Is there anything else? No? Don't hesitate to ring if you should need anything." She smiled as she continued down the aisle and John returned the expression. He lost his smile as soon as he was alone.

It was no laughing matter.

It hadn't been a laughing matter for over twenty years now, and the war, the cold war, naturally, though people no longer made that distinction, had grown steadily worse.

The spies and propaganda and underground cells could be tolerated; civilization had grown up with them as it had with cold and hunger and disease, but sabotage was something else.

Because a saboteur could, now, as never before, destroy a fantastic amount of material, production potential and man-hours of labour and time.

Civilization had grown unbelievably complex and that very complexity had made it hopelessly vulnerable to an internal enemy. A handful of grit could ruin the drive of a battleship. A pair of clippers could rob an entire area of light and power and communications. A scrap of metal could derail a train, bring a factory to a halt or disorganize the smooth flow of supplies. Little things in themselves could have far-reaching consequences utterly out of proportion to the means used to create the disruption.

And an atom bomb could be carried in a suitcase.

It was impossible to forget that fact. One small bomb, correctly planted, could wreak more havoc than a hail of guided missiles from the skies. Propaganda had tried to deny it for fear of the repercussions on civilian morale, but the fact remained. One man, with one bomb, could cause more damage, at less cost, than any other weapon ever devised.

The defence was secrecy. Utter and absolute secrecy about anything and everything; justified in the name of Security and enforced with a desperate fanaticism born in hate and fear. No one knew anything about anything, asked no questions and answered none. It was a natural result of the endless propaganda, security checks, loyalty checks and continual investigations which tried to ensure absolute loyalty and total security. They had failed. Sabotage had mounted and the hysterical insistence on Security had mounted with it. Now it had reached a stage where a man had to deny what his own intelligence taught him for fear of learning what he was not supposed to know.

And still the sabotage mounted.

John sighed as he thought about it. The stewardess had known as well as he did that the buildings with their unmistakable towers could be nothing other than an atomic reactor plant built at least twenty years ago. She had automatically denied that knowledge for fear of being accused, if anything happened to the plant, of subversive activities. What a person didn't know couldn't hurt them, and Security cops, uniformed and disguised, were everywhere. She probably thought that he had been trying to trap her.

He opened the file on his knees. It contained the results of over two hundred investigations into various cases of sabotage, and, from them, he was working to crystallize the cause and so discover the cure for the trouble which plagued the nation. They ranged from an adolescent who had cut the phone wires serving an exchange so as to prevent his rival from calling up his girl friend, to a man who had deliberately overloaded the safety fuses of a computer and so had ruined a valuable machine. From a line-repair man who had wanted more overtime, to a man who had used the mails to post letter-bombs to public figures against whom he had a grievance. Some were comic, some murderous, some stupid. Most were annoying rather than dangerous, and others were hopeless in their inefficiency. All were punishable by death.

The stewardess came back down the aisle and gave John a strained smile. This time she didn't talk to him, and when he gestured, her smile became even more strained.

"Yes, sir?"

"I'd like some coffee, please."

"Certainly, sir." Her relief was pathetic. "Anything else?"

"Yes." He paused just long enough to make her unhappy.

"How long until we land?"

"Thirty minutes, sir. I'll get your coffee right away."

The airport glistened in a wet drizzle which made the security posters seem even more garish and tasteless than

ever. Aside from the usual terse commands to *Button Your Lip! If You Know—Don't Tell!* and *Talk is Trouble!* there were others, apparently for those who could not read. A leering Mongolian with an exaggerated ear listened to a couple of well-dressed business men, a simian Oriental stabbed a beautiful girl in the back, a coffee-coloured head-hunter bared filed teeth at the spectacle of a burning city. All the representations were ludicrously-distorted and would have been comic had the intent behind them not been so serious.

"Do they really work?" John glanced at the young officer who had met him. Mark Weston, his uniform bearing the insignia of the Interrogation Corps, hesitated before replying.

"If they can persuade one individual to take Security a little more seriously, then they have justified their existence."

"A nice, safe answer," said John. "But what about the other effects? To portray as obscene enemies those who have different features or coloured skins to ourselves is hardly the way to prepare for world peace, is it?"

"I wouldn't know," said Mark shortly. "We can worry about that when the time comes." In the car, he grew more friendly. "I've heard about you, doctor, and of the fine work you've done in interrogation techniques. Your recommendations have been accepted as standard pre-interrogation procedure for all suspects." He produced cigarettes, offered them, and lit them from a lighter. "Would it be in order to ask if you are engaged on anything at the present?"

"The usual problem." John inhaled, the smoke burning his throat. "Sabotage, and what we can do to prevent it."

"Doesn't that concern Security more than us?"

"Perhaps; Security would say so, I know. But Security tries to prevent sabotage by guarding essential installations and an ineffectual system of weeding out suspected persons."

"Ineffectual?" Mark sounded slightly shocked. "I would hardly call it that."

"Why not? The proof is in the constant rise of sabotage. If the methods used by Security were as effective as they would have us think, then surely sabotage would drop, not mount." John glanced out of the windows at the rain-swept landscape. They were travelling along a narrow, concrete road towards a grim, fortress-like building. "This is just a theory, of course, but I feel that we are doing something wrong somewhere. Security is, in effect, locking the door after the horse has gone. You have probably noticed how, after each incident, Security clamps down a little tighter. Sometimes I wonder where it will all end."

"It will end when the war ends," said Mark shortly. "Until then we must do the best we can." He leaned forward as the car swept to a halt before a guard house. "Captain Mark Weston returning with Doctor John Evans and driver."

The guard stared through the windows of the car, made a note on a clipboard, then gestured the driver to continue.

Mark didn't resume the conversation and John had the uneasy feeling that he had said too much. Security was a brittle egg, and no one felt safe in even discussing it. Such talk could be twisted to mean dissatisfaction, and that could lead to an investigation. No one had ever come out of such an investigation with the same or higher security rating and, for a man depending on government work for a living, that was serious. Suspicion had a habit of snowballing, and once a man had been even remotely under a cloud he usually wound up in the gutter.

Government employees, like Cæsar's wife, had to be above suspicion.

The car halted for a second time at the door of the fortress and Mark led the way into the building. John followed him, clutching his personal baggage, then had to wait while it was examined, his papers checked, and a phone call made to someone in the higher echelons.

"Routine," said Mark, as he led the way to an elevator. "All incoming personnel and baggage have to be cleared by

Security." The doors shut behind them, the elevator whined as it carried them up to the tenth floor, the doors opened and they halted before an armed guard. John patiently allowed his papers to be examined for the second time.

"The colonel will give you a twenty-four hour clearance for this building," said Mark as they continued down a corridor. "It'll make things a lot easier."

"I see what you mean," said John dryly, as they halted for the third time. "From the look of things you must need Security permission in order to wash your hands."

"We've got to be careful," said Mark. "I'll admit that it seems to be overdoing things, but it's better to be safe than sorry. Anyway, no loyal citizen should protest at regulations designed for the common good."

"Of course not." John returned his identification to his pocket. "Who is in charge of Interrogation here?"

"Colonel Malcome. We are going to see him now." Mark chuckled. "This case has got him beat, but he'll tell you about it himself." He paused before a door, knocked, waited, then opened it and stepped inside.

Colonel Malcome was a big man with a thick neck and hands which looked as if they could snap a two by four as though it were a match. His hair was short cropped and iron grey, his eyes a frosty blue, his mouth a thin crease above his chin. He waved John and Mark to chairs, continued reading a document before him, signed it, pushed it to one side, then turned his frosty eyes on John.

"I requested Interrogation Centre to send me an expert," he said. His voice matched the rest of him: deep, harsh, impatient. "I had expected an officer, not a civilian."

"The lack of military rank gives me certain advantages," said John smoothly. "It makes it easier for me to gain the confidence of suspects and, when dealing with the military, I am unawed by superior rank. It makes things much easier

if I can operate without the fear of being court-martialled and, from your point of view, anything I do cannot reflect on your organization." He smiled. "Anyway, does it matter?"

"As long as you can do your job, no." Malcome dismissed the question as unimportant. "Has Captain Weston briefed you?"

"No."

"The position is this," said Malcome. "We have a suspect. We picked him up five hours ago and have treated him according to the general directive." His tone left no doubt as to his private opinion of the blanket instruction that all suspects were to be brought to an Interrogation Centre, isolated, and treated more like delicate guests than the enemies of the State they usually were. John recognised the tone, the reason for it and the frustration behind it.

"The directive is based on common sense," he said mildly. "If the suspects are proven innocent, then they leave full of praise for Security and more law-abiding than ever. If guilty, then it doesn't really matter how they are initially treated, does it?"

"Doctor Evans is the man who recommended the general directive," said Mark hastily. Malcome wasn't impressed.

"I consider it a waste of time," he said coldly. "But let us not go into that. Yendle has been under arrest for five hours now. I could have got the truth out of him in one."

"But you tried, didn't you?" John smiled, but his eyes did not. "You tried and failed, and so have made my task just that much more difficult."

"I don't see that."

"It is always more difficult to impress a man if he is convinced that you are a fool," said John. "On the other hand, it is always dangerous to underestimate your enemies." This time, when he smiled, his eyes joined in. "Let us say that the whole thing cancels out, shall we?"

"We passed the suspect through the normal pre-interrogation routine," said Mark quickly, before Malcome could

“Security has checked him and forwarded his dossier. We sent for you only when it became obvious that an expert was essential.”

“Any traps?”

“None, he was clean.”

“Hypnosis?”

“Yes. I tried the usual routine, but the reactions were so violent that I had to desist.”

“And then?” John smiled as he waited for an answer. “And then,” he continued, “the Colonel grew impatient and tried more direct methods. He shouted and raved and probably threatened. He may even have appealed to the man’s sense of decency and loyalty, and, of course, he achieved precisely nothing. Am I correct?” He didn’t need an answer; their expressions confirmed what he had said. John sighed, the pattern was all too familiar. Call in the expert after everything else had been tried. “I suppose that there is no doubt as to his guilt?”

“None.” The colonel turned his frosty eyes on the doctor. “We know that he has committed sabotage, and he knows that we know it. We can even guess what manner of sabotage it was, but we don’t know where, or when, or how. We won’t know until it blows up in our face or until he tells us.”

“When you say ‘know’ do you mean that literally?”

“Yes. One of our agents passed us a list of names, and Yendle’s was among them. We picked him up at an airport five hours ago.” Malcome frowned. “He didn’t struggle or attempt to escape. He seemed to regard the whole thing as a great joke.” The big hands clenched. “I’ll give him joke, the swine! He was hot when we checked him. His clothing and skin carried a high degree of radioactivity, far above anything which he could have picked up normally. Do I have to tell you what that means?”

“No,” said John. He felt a cramping of his stomach. It had come, the bomb in a suitcase, and for the first time he

could sympathise with the colonel's impatience. "How much time have we got?"

"How do I know? We are combing every possible area in which he could have been, back-tracking his movements and checking his associates. From the radioactivity on his clothing, he must have planted the bomb not more than twelve hours before his arrest, but that doesn't help. In twelve hours a man could go around the world." Malcome picked up a thick dossier from his desk and handed it to John. "Here is the dossier. Captain Weston will work with you and give you what help you may need." He looked at John. "Yendle has information. I must have that information. The lives and safety of I don't know how many people depend on my getting it. Your task is simple—make him talk."

The way he said it made it sound easy.

Fred Yendle sat on a chair designed to give the maximum amount of discomfort in a room which was little more than a cell. The door was set flush with the wall; in one corner, high against the ceiling, the grille of an air conditioner matched the smaller one of a speaker. The two long walls were panelled with some dull grey material. The smaller wall opposite the door held a toilet. It, the door, the chair and floor and walls were all of the same uniform, neutral grey. It should have been restful, but all it did was to turn attention back on itself.

But Yendle wasn't worried.

He hadn't been worried for a long time now, not since the moment when he had planted the suitcase at . . . He smiled. Best not to think of that name, best to think of anything but that name. Better even to think of his arrest than where he had planted the suitcase.

He had enjoyed the arrest. It had been so funny, so riotously amusing, the two men so serious, the hand on his arm, the startled expressions of those around him, the whole

thing added to one big laugh. He chuckled as he thought about it, jerking up from his chair as the need for action overpowered him, and striding about the room with quick, jerky steps. He felt wonderful. He felt as if he could laugh and sing and jump in the air from very joy.

He did.

Mark scowled through the sheet of one-way glass separating the tiny office from the cell, then looked at John.

"He's at it again."

"Is he?" John lifted his head and stared through the window. He sat at the desk, the dossier open before him, the thin sheets which comprised a man's life neat in their folder. "Tell control to step up the carbon dioxide. He can't keep it up much longer."

Mark nodded and picked up a phone. He relayed the order, listened, spoke again and hung up. "Read that dossier yet?"

"Yes." John closed the file and stared thoughtfully at Yendle. He had sat down again and seemed to be having trouble with his breathing. "You say that he was clean?"

"We stripped, washed, X-rayed and examined him," said Mark. "No hidden poisons, weapons, planted bombs or bacteria. We made very sure of that."

He sounded grim, and John knew what he was thinking. Saboteurs had long passed the stage where they were merely an instrument of destruction. Now, quite often, they were weapons in themselves, and too many Interrogators had died as the result of surgically planted explosives.

"At least he is not a fanatical agent," mused John. "An enemy national would have taken full precautions against arrest. He resisted hypnosis?"

"Yes. I tried the usual techniques, but none of them worked. I tried a minimum dose of neoscop and he almost died." Mark looked worried. "Frankly, doctor, I don't know what else to do."

"How did the colonel make out?"

"As you said. Yendle just laughed at us. He wasn't even worried when the colonel threatened immediate execution."

"Naturally, he knew it to be an empty threat." John glanced through the window again. "What do you think of him, captain?"

"He's a traitor."

"Is he?" John sighed. "To you a traitor, to another a patriot, to a third a misguided fool, to a fourth a tool to be used, to a fifth a man to be pitied. Who is right?"

"Do you pity him?"

"To me he is a problem," said John. "A safe to which I must find the combination, a puzzle which has to be solved, an adversary in a complicated game. Hate has no place in that game, nor fear, nor the desire to hurt. That is why we have an Interrogation Corps. The obtaining of information from suspected enemy agents, subversives and saboteurs is now a science."

"Yes," said Mark. He looked at John with an odd expression. "You know, to listen to you, anyone would think that you sympathized with Yendle. You seem to forget what he is."

"Every man is the result of what is done to him by others," said John mildly. He nodded towards the window. "Look at him, a normal seeming man, the kind of man you would imagine to have a home, wife, children. The kind of man who tends his garden, walks his dog and swaps garden-fence politics with his neighbours. And yet he's guilty of the basest crime we recognise."

"The worst crime there could possibly be," corrected Mark. "There can be no excuse for treason."

"That is a matter of opinion," said John. "Personally, I regard a man or woman who ill-treats their young as being worse than a traitor. Society can defend itself, a child cannot, but, naturally, you cannot agree with me."

"Cannot?" Mark looked puzzled. "I don't quite understand what you mean."

"Forget it." John concentrated on the papers before him, conscious of his own desire to hit out against a system he secretly despised, and yet knowing that attacking the end-products of the system was worse than useless. The captain could no more help his feelings than he could control the beating of his heart.

Beyond the window, Yendle rose, yawned, and walked about the narrow confines of the room. He yawned again, shook his head and resumed his seat.

"Better fetch him in," said John. "And tell control to restore the cell atmosphere to normal. We don't want him passing out on us."

Yendle was enjoying himself. It was obvious from the way he acted, the manner in which he moved, the constant, almost hypnotic, flickering of his eyes. He smiled as John gestured towards a chair, and smiled even wider at the offer of a cigarette.

"What's all this, the all-old-pals-together act?" His voice was high-pitched and the words had a tendency to run together.

"I'm a heavy smoker," said John mildly. "It would be rude of me to smoke alone; also," he became confidential, "your smoking gives me an excuse to indulge." He lit both cigarettes, inhaled and stared at the suspect. "Want to tell me about it, Fred?"

Yendle grinned, dragged at his cigarette, then stared at Mark, who had taken a chair just behind him. "What about the boy scout, doesn't he smoke?"

"To hell with him," said John. "Forget him; he won't bother us." He leaned forward across the desk. "Look, Fred, I'm a civilian, just like you, and you can talk to me. Now, why don't you just tell me all about it?"

"All about what?" Yendle's eyes halted in their flickering. "I don't know a thing. I was just standing in the bar having a drink when those two goons came up to me and arrested me. All I was doing was waiting for my plane when they grabbed me. I don't know a thing."

"Where were you going?"

"Mexico. I . . ."

"Why?"

"Why?" Yendle blinked, his spate of words halted by the abrupt questions. "Why not? I can go to Mexico if I like, can't I? It's a free country, isn't it?" He sneered, his face becoming ugly. "Like hell it is!"

"So you don't know a thing? Is that it?"

"That's right."

"You mean that you were used? That you didn't know what you were doing?"

"I didn't say that. I knew what I was doing all the time, and I was glad to do it to those lousy cops . . ." Yendle broke off and bit his lips. "I'm not talking."

"But you want to talk, don't you?" John smiled. "You can't help it. You're full of words, they bubble inside you like the gas in a bottle of mineral water, and they want to come out." His voice deepened and became infinitely persuasive. "You don't have to be afraid of me, Fred. I'm your friend. You can tell me all about it. I've been through the mill myself and I know what it's like. Why not tell me about the party?"

"What party?"

"The hypkick party." John was taking a chance, but it was worth the risk. "I know all about them; been to a couple myself. What did they use, mirrors?"

"No, some . . ."

"Or maybe they used some revolving gimmick fixed to the lights." The chance had paid off. John smiled as if at a pleasant memory. "I remember one party I went to. Man, what a night that was!"

"You're telling me!" Yendle's grin threatened to split his face. "You don't know half. You want to go real deep, throw off those old inhibitions and hit bottom. You can't manage it the first time, but take a couple of pills and . . ."

John sighed, relaxing in his chair, only half aware of what the other was saying. Not that it mattered; the recorders would be saving every word, but he knew that the rush of words held little of importance.

It was arrest-euphoria, the near hysteria caused by post-hypnotic conditioning and triggered by the shock of arrest. Yendle, despite the depressive effects of the carbon dioxide pumped into his cell, was feeling on top of the world and so supremely confident of himself that nothing could touch him. Threats, to him, were unreal, everything was unreal. He was like a man high on a merry drunk and all he wanted to do was to talk and talk and talk. But he didn't talk about what John wanted to know.

The rush of words died and John, waiting for the moment, asked a question.

"Where did you plant the bomb, Fred?"

"Al . . ." Yendle gulped, his face turning a dirty white and the words strangling in his throat. "No!"

"Who gave you the bomb, Fred?"

"I can't tell you! I can't!"

"When is it due to blow, Fred?"

"I don't know!" Yendle recovered himself. "You're wasting your time, you'll get nothing out of me."

"No?" John shrugged. "Don't be too sure of that, Fred. I won't hurt you, but others may. You know what they could do to you, Fred? They could give you a pre-frontal leucotomy; they'd take an ice-pick and push it past your eye into your skull and rip the front part of your brain. It wouldn't kill you, Fred. It wouldn't even blind you, but you wouldn't be much of a man afterwards."

"Hogwash!"

"Or they could experiment on you," said John softly. "They could take you and fill you with bugs so that your flesh would rot and stink, and you couldn't stand the sight of yourself. Or . . ."

"Cut it out," said Yendle. "You can't scare me."

"I'm not trying to scare you." John shook out fresh cigarettes and lit them. "I'm just telling you what could happen to you. That bomb you planted was an atomic one. Did you know that?"

Yendle remained silent.

"They don't like that, Fred," continued John. "They want to take you out and work on you."

"They won't kill me." The conviction in his voice was incredible.

"Did I say anything about killing you?" John dragged at his cigarette until the tip shone bright red. "Do you know what pain is, Fred? Real pain, I mean, the kind of pain which twists your nerves and seems to go on for ever. You couldn't stand that sort of pain, Fred. You'd whine and beg and pray for them to kill you. And they could set up mirrors so that you could see what they were doing to you. You'd see them open your flesh and fish for a nerve, and when they touched it it would double you up. But you wouldn't be able to move, Fred, you'd be strapped down on the operating table, and all you could do would be to look and scream, and scream, and scream. You'd have to tell them then, wouldn't you, Fred? But then it might be too late to save you. Why not tell me now and save yourself all that trouble?"

"Who are you kidding?"

"You don't believe me?" John leaned forward, reached out with his left hand and caught hold of Yendle's wrist. He pressed the glowing tip of his cigarette against the trapped hand.

Yendle fainted.

Colonel Malcome scowled at the map fastened against the

wall, stabbed at it with a thick forefinger, then spun in his chair to glare at John.

"Al," he said. "Is that all you can get?"

"Yes. We've other information, of course, but nothing directly affecting the search. Are you working on it?"

"Naturally, but we can't work miracles. Just how many places do you think have names beginning with the letters Al?" Malcome snorted. "There are thousands of them. Towns, states, installations, whistle stops and tank towns." His finger jabbed towards the map again. "We've drawn a circle at the approximate range a man could normally travel in twelve hours. We've had to discount the skyliners and direct expresses; they cover the whole country. Even taking it at its lowest, the circle is a thousand miles in diameter, and it should be twice that to do a thorough job."

"You can eliminate quite a bit," said John. "South of the border, the desert, the too-small towns and place-names. They wouldn't waste an atomic bomb on anything relatively unimportant."

"Security is working on that," said Malcome. "They are filtering location cards through an electronic sorter concentrating on essential installations in order of importance. The first batch produced five localities within the area. They lowered their specifications and the second run came out with fifty-three. They are working on the third now."

"Tough," commented John, and knew that he was making a classical understatement. Each locality would have to be checked by Security, and each locality, in itself, was a full-sized job. The search had to be thorough, and, to be effective, would have to cover about five square miles of terrain. Even with the new scintilloscopes it was a task to stagger the imagination, especially as most of the localities would be normally radioactive from the work done within them.

"It's more than tough," said Malcome bitterly. "It's impossible. Even assuming the letters Al designate the name

of a specific locality, and not a state or place name, it is impossible. Security just hasn't that amount of men to conduct the search. All we can do is to take a few at a time and work down the line and hope we reach it before it blows." His big hands knotted into fists. "And we don't even know how much time we've got."

"No."

"Can't you get it out of him?"

"Eventually, perhaps, but when is something else." John lit a cigarette. "He's unconscious now. I tested his pain level and found it, as I suspected, incredibly low. We shot some sedatives and something to lift the pain level into him, put him back in a vitiated atmosphere, and Mark is waiting for him to recover." John stared at the thin coil of smoke rising from between his fingers. "I found out that he had been to a hypkick party, probably more than one. I'd say that was where they first started indoctrinating him."

"They should be stamped out." Malcome sounded disgusted. "A lot of perverts getting together to give themselves a lift from hypnotic illusions. Those parties are worse than dope."

"I agree." John held no brief for the illegal hypkick parties in which a hypnotist used a simple technique to induce trance and temporary illusions of grandeur. They were illegal, yes, but so was gambling, dope and pornography; and no one, yet, had found a way of making the laws banning any of those things stick. The only way was to compromise, allow them to exist under semi-official supervision, but it was as impossible to control them as it had been to control drinking during prohibition.

An aide entered the office, saluted, dropped a paper on the desk, saluted again and went out. Malcome picked up the flimsy, read it, crushed it in his hand and flung it into the disposal bin. There was a brief flash as the paper was reduced to ash.

"The third run produced a hundred and eighty-seven localities," he said. "They're working on the fourth now. God knows how many they will get the next time." He sounded desperate. "Can't you blast the information out of him? Probe his mind or something?"

John shook his head.

The phone rang and Malcome scooped it up in one big hand. He listened, grunted, handed it to John. "Captain Weston. He wants to speak to you."

"Evans here." John listened to the thin voice in his ear. "No. He's had too much already. There's nothing we can do now until he snaps out of it. Let me know when he recovers consciousness." He hung up and met the colonel's frosty blue eyes. "Captain Weston is getting impatient," he said. "He wanted to try shock therapy."

"Is that bad?"

"It could be fatal." John picked up his cigarette, drew on it, frowned, crushed it out and lit another. "Look at it this way, colonel. If a guided missile were to land without exploding you would naturally investigate it. You would assume that it was a bomb which could be detonated by any one, or more than one, of a number of fuses. Your expert would first have to determine what those fuses were, find some way to by-pass them, and then dismantle the bomb and find out what was inside. Fred Yendle is no different, in principle, to such a bomb. He has the knowledge we need, but that knowledge is protected by mental and physical fuses which, if wrongly tampered with, will send it beyond our reach."

"I follow you," said Malcome. He was a single-minded man, but not an unintelligent one, and he had had experience of saboteurs before. "The trouble is the time element. If he were an ordinary saboteur you could take all the time you want, but this time we can't give you that. The bomb he planted could blow at any moment."

"I know it," said John. "It doesn't make things easier." He sucked smoke deep into his lungs, held it, let it stream through his nostrils. "We know that Yendle is loaded with post-hypnotic commands. The arrest-euphoria proves that, as well as the refusal to be hypnotized. Hypnotic drugs caused a violent physical reaction, psychosomatic, of course, but none the less real or dangerous because of that. Further use of neoscop or other truth drugs will lead to a paroxysm resulting in death. He has also been protected against the third degree. His pain level was so low that he automatically fainted at the pain from a minor burn."

"A nice picture," said Malcome, and the lines in his face deepened as he thought about it. "We can't beat the truth out of him; he will escape into unconsciousness at the first blow. We can't hypnotize him; he has been conditioned against it. We can't drug him; he will die." The big hands clenched. "Execution?"

"Not if you want the information. Yendle is a national, he has been reared in a law-abiding atmosphere, and he knows that you can't execute him without a trial. He also knows that you won't kill him, because, if you do, you will lose the very thing you are trying to get."

"But he doesn't expect to get away with this?" Malcome sounded incredulous. "He must know that the penalty for sabotage is death. Surely, he doesn't think that he is going to walk out of here a free man."

"Yes," said John slowly. "That is exactly what he does think." He shrugged at the colonel's expression. "Yendle isn't normal, and I'm speaking in the broadest psychological sense. His reactions are all wrong and totally artificial. He has no sense of guilt, no fear, no lack of confidence. He is unable to regard what he has done as serious. To him all this is a game. He has never seen a dead man, the shocking results of atomic disruption, the blood and wounds and shattered bodies. Basically, all he wanted to do was to cause trouble."

"Trouble!" Malcome sounded grim. "I'll give him trouble. I've got every man I can spare on the job. Every department of Security has been alerted and special groups of men flown out to those locations with the highest priority. Every installation selected by the computer has gone on full-security search. The loss of production alone must run into the millions of man-hours. And you talk of trouble." The big hands clenched, matching the anger in the frosty eyes. "I'll show that rat what trouble really means. Personal trouble."

"Yendle will die," said John evenly. "You know it, I know it, but Yendle himself refuses to believe it. He is armoured in his conditioning, which has convinced him that nothing unpleasant can happen to him—*providing he does not talk!* Once he talks his protection has gone. To him, his silence is literally his life. If we try to blast it from him against his will he will fight against us in the only way he can. He will escape into insanity or unconsciousness. He may even escape into death."

"I wouldn't call that much of an escape."

"Psychologically speaking, death offers the perfect escape," explained John. "It is extreme, but it is always there. I need only mention suicidal mania to illustrate my point. But Yendle need not die to escape from us; he can always retreat. He can, mentally, return to the past, away from the troubles of the present. But no matter how far he retreats, he will always find troubles to escape from. He will retreat to the embryonic stage, unable to eat, to concentrate, to do anything to help himself. He will lie, curled up in the foetal position, utterly useless and absolutely helpless. We call it *dementia præcox*."

"Nasty," said Malcome. "But not as nasty as a bomb tearing the heart from one of our cities. Yendle is only one man, a traitor at that, and he is expendable. What happens to him is not important; discovering the location of the bomb is."

The phone rang and John arrested his instinctive gesture towards it. Malcome lifted the handset, listened, replaced it.

"That was Captain Weston. Yendle has recovered." He looked grim. "Don't be gentle with him, doctor. We need that information."

Yendle had been arrested at 14.00 hours. He had been under arrest for five hours when John had arrived. The initial interview, the preparation and testing of the suspect had taken four hours. Yendle had been unconscious for ninety minutes. John had a mounting uneasiness that time was running out. He stared grimly at the suspect.

Yendle was no longer enjoying himself. The discomfort of the room, the vitiated air, the drugs injected into him had all worked to reduce his euphoria. A red patch on his cheek where Mark had slapped him seemed to cause him trouble. He kept touching it, shocked that he had felt the pain and had not lost consciousness. This time, when John offered him a cigarette, he took it more as a man thankful for small favours than with his previous air of cocky condescension.

"All right, Fred," said John. "Now I want you to talk. I'm not going to ask you where you planted the bomb, so you don't need to watch your answers." He smiled. "Let's make a game of it. If you answer, then I'll chalk up a mark. Ten marks and you get a cigarette. If you don't answer, then Captain Weston will hit you." His smile became wider. "You can't run away from the pain now, Fred, and it will hurt. When is the bomb due to blow?"

"I don't know."

Mark stepped forward, his hand lifted. John shook his head.

"You mean that, Fred? You really don't know?"

"That's what I said."

"Good, one mark. Who gave you the bomb?"

"I don't know. I mean it," said Yendle hastily. "I don't know. I picked it up from a check-baggage depository."

"When?"

"Late last night." Yendle looked bewildered. "I think it was last night."

"At what time?"

"About ten."

"Where?"

"Houston, Texas. It was in one of those transient depositories at the bus station on Baynard Avenue."

"What did you do then?"

"I caught a train."

"To where?"

"To . . ." Yendle hesitated, then cringed as Mark came towards him. "I can't remember. I . . ."

Mark swung his hand.

It wasn't pretty and it wasn't nice, but it had to be done. John watched impassively as the captain slapped Yendle with a vicious one-two to either cheek. The blows, in themselves, were not too serious, but the mental effect they were having on the suspect was equivalent to a psychic explosion. He could be hurt. He didn't want to be hurt. The only way he could stop being hurt was to talk—but he dared not answer the question.

He compromised. "To Albuquerque."

"Albuquerque!" Mark halted the downswing on his hand. "Doctor, we've got it!"

John refused to be excited.

"Then what did you do?"

"I walked around for a while and then caught another train."

"To where you were arrested?"

"Yes."

"How much was the fare from Houston to Albuquerque?"

"I . . ." Yendle swallowed. "Fifty dollars."

"What time did you arrive?"

"At dawn." Yendle volunteered more information. "I had breakfast at a diner and looked around before catching my train."

"Is that where you left the bomb?"

"I . . ." Yendle hesitated. "Yes."

"Where did you leave it?"

"In . . ." Yendle swallowed, his adam's apple bobbing in his throat. "In the cloak room of a hotel."

"Which hotel?"

"The . . . the Grand."

"I see." John picked up the phone, dialled control, spoke, listened, replaced the receiver. "You're lying, Fred, and you know it. You don't know the fare from Houston to Albuquerque, no train arrives at dawn, and there is no Grand Hotel." He nodded to the captain and Mark stepped forward.

Yendle began to cry after the third blow.

John recognized the symptoms and halted the punishment. To continue it was worse than useless. No simple system of trick questioning would yield the desired information, and lies only wasted time. Yendle was willing to tell the truth only because the strain of remaining totally silent was too great for him. He had compromised with himself; the essential information he would retain, the rest he would divulge. He was like a man on a long hike who wanted to lighten his load. He would dispense with everything but the one item necessary to his survival. His lies were merely a protective device to save him from punishment. Continue the punishment and he would find escape in some other way.

John reached for the phone, called the colonel, gave him the news.

"He either slept next to the bomb or travelled with it on the seat beside him," he said. "That would account for the radioactivity on his skin and clothing. Does that help you at all?"

"No," said Malcome. "With transport the way it is he could have travelled fast or slow, direct or by a circular route. But I'll put men onto checking all transport leaving

Houston during the effective period." John heard him suck in his breath. "But it takes time! Time!"

"That's another point," said John. "The delay between the planting of the bomb and the blow-up seems all wrong. The only way I can account for it is to assume that it could not have been planted later than it was. What localities have you which enforce a total Security ban at set periods? If there are any, then maybe we can isolate the bomb that way."

"I'll work on it," said Malcome. "Let me know if you get anything new."

John hung up, reached for a cigarette, and suddenly met the eyes of Yendle. The official in him gloried at the dull, beaten expression in his eyes.

Pity made him hand the man a cigarette.

Mark opened the door, took something from someone outside, closed the door and returned to the desk with a tray bearing cups and coffee.

"White or black?"

"Black, with plenty of sugar." John turned from where he had been staring at Yendle through the one-way glass. It was 03.00 hours, the suspect had been returned to his cell an hour ago, and John was beginning to feel the full effects of fatigue. His head ached a little, his eyes seemed full of grit and his mouth burned from too much smoking. He had been awake most of the previous night working at his papers and now missed the lost sleep. How Yendle must feel was anyone's guess but, knowing what he did, John could feel sorry for him. He spooned his coffee, tasted it, set it down.

"More sugar?" Mark reached for the bowl.

"Too hot." John stared back through the window while his hands found and lit a cigarette. "An interesting case, Yendle," he said. "A man with a grievance who has been

used by regular enemy agents to do their dirty work for them. Even at that the thing is full of inconsistencies."

"Such as?"

"Atom bombs aren't cheap, and they aren't the easiest things to obtain. It was smuggled in, of course. A fast plane across the border and a dead-drop at a pick-up point would have taken care of that. Metal isn't hurt by impact with the ground, and the units could have been delivered separately." John picked up his cup. "What puzzles me is why use Yendle at all? Why not a regular agent?"

"Maybe they're running out of agents?" suggested Mark. "Security rounded up most enemy nationals and the few that are left are under constant supervision. Perhaps they had to use one of our people in order to avoid suspicion?"

"Or as a guinea pig?" John swallowed his coffee, set down the cup, and refilled it from the pot. "Suppose that they wanted to test our efficiency and, at the same time, remain safe. They could have used Yendle as a test-piece. The tip-off to the agent who reported him could have been fixed as could the radioactivity on his skin and clothing. Hypnotic conditioning would have tailored Yendle to almost anything they wanted."

"I don't get it," said Mark. "If they used him as a guinea pig, then that means that there needn't be a bomb at all." He looked startled. "Is it possible?"

"I think so."

"But why? What would be the point in it?"

"Sabotage needn't stop at the destruction of material; it can be quite as effective in other ways. Ever since Yendle was arrested, thirteen hours ago now, every resource of Security has been channelled to track down the supposed bomb. But what if there is no bomb? What then?"

"No harm has been done," said Mark promptly.

"This time, no, but what of the future?" John looked pensive. "You've heard of the story of the boy who cried

'Wolf.' In the end no one believed him when the wolves really came. Suppose that we have a series of such incidents, we can guess what would happen. Security would get rattled, and, in order to protect the country, would bear down even harder than at present. People would grumble, protest, and the pressure would increase. In the end we would become a total totalitarian state, ruled by Security under the justification of guarding against sabotage. Incidentally, we are not so far from that unhappy state of affairs at the present."

"I can't agree with you," said Mark shortly. "We are a democratic people who have yielded some of our personal liberty in order to fight a war. No loyal citizen can protest against the regulations designed to protect his country."

"And if he does, of course, then he isn't loyal." John didn't press the point. "There is another possibility if it turns out that there is no bomb. Continued scares and threats which turn out negative may have the effect of lulling people into a false sense of security. Then, when no one really believes in the threats . . ." He made a motion with his hands.

"It's logical," admitted Mark slowly. He stared down at the cup in his hand.

"It's more than logical," said John. "It's pure psychological engineering."

"Do you believe that this is the case? That there is no bomb?"

"Not really. Any such plan as I have described requires a long-term policy and a shrewd understanding of our national character. Also, again taking the long-term view, there is little point in one totalitarian state forcing another of a different system to adopt their regime. It would be the same as making your opponent as fit and as strong as yourself. They firmly believe that our strength, our democracy, is our weakness. The trouble is that we are wasting our strength to become something which we profess to despise. Security,

while ideal on paper, cannot be enforced without adopting some of the attributes of a totalitarian regime."

"That, of course, is your personal opinion?" Mark seemed a little strained.

"That is more psychological engineering," said John. "And, as a psychologist, you should know it as well as I do. Once people stop becoming men and women and start becoming units, then we have hit the skids away from democracy. It is too easy to be impersonal about a unit, too easy to justify actions which hurt some but are for the supposed good of many. Society is not an entity, but a collection of individuals. True democracy dies the moment we ignore that fact."

"Perhaps." Mark didn't want to talk about it. Privately, he considered Evans to be a doddering old fool, whose tongue would get him into trouble if he didn't watch it. As a psychologist he was good, Mark had to admit that, but even an expert psychologist couldn't hope to retain his high Security rating if he went around talking such subversive nonsense. He changed the subject.

"What are we going to do about Yendle?"

"Crack him, naturally; there is nothing else we can do." John stared through the window at the slumped figure on the uncomfortable chair. "Get me a pistol, some bullets, and ask Colonel Malcome to come here as soon as possible."

The pistol was a .45 service model and the bullets seemed, to John, to be unnecessarily brutal. He imagined being shot with one, cringed at the imagined impact of lead against his flesh, then demanded to be shown how the gun was loaded, how it worked and other important details.

"When did the colonel say he would be here?"

"Soon." Mark was curious. "He has some work to clear up before he can leave the office. Why did you want the gun?"

"Psychology uses many weapons," said John mildly.

"Drugs, hypnosis, shock therapy, induced insanity, even outright surgery. It can even use force." He toyed with the pistol, loading the magazine, working the slide and watching the cartridge slip into the breech. He unloaded the pistol, expelled the cartridges from the magazine and began to fill it again. "How do you . . . ?" He grunted. "Never mind, I can see how it works."

"Be careful," warned Mark. "That thing can kill people." He glanced through the window, then at John, his eyes incredulous. "Yendle?"

"Yendle is in a peculiar mental state," said John. He fumbled with the gun, nodded, and expelled all the cartridges again. They lay on the desk before him, gleaming copper and brass in the brilliant lighting. He rested the gun beside them, the dark metal and plastic grip holding the beauty of a well-designed mechanism.

The door opened and Malcome walked into the office.

He glanced at the gun, stared through the window, and sat down. "Well?"

"We were talking of Yendle," said John softly. "He is in a peculiar mental state at the moment. When he was arrested he immediately went into near-hysteria. It was artificially induced, but quite effective. He rode the crest of one end of his emotional cycle and felt literally on top of the world. While in that state nothing could touch him, but there was one thing wrong with it, it couldn't last."

"So?"

"So Yendle is now on his way down to the other end of his emotional cycle, the manic depressive stage. From feeling wonderful he will feel, literally, like hell. He will be tormented by guilt and fear and utter depression, and death, to him, will be an escape from an unendurable existence. The condition will be exaggerated, of course. A normal man does not normally swing to the extremes of his emotional cycle in twenty-four hours. We can thank his friends for that, the

ones who planted all the hypnotic conditioning, but, artificial or not, it will be just as effective. Unless he is executed he will commit suicide."

John picked up the gun and toyed with it. Malcome glanced at it, looked surprised, then concentrated on what John was saying.

"But don't imagine, even then, that you will learn anything from him. He will remain silent because any information he gives may serve to alleviate his punishment, and that will be the last thing he desires."

"Then there is no hope?" Malcome glanced again at the pistol John was holding. The doctor was now toying with the bullets, lifting each one and slipping it into the magazine. "What's that thing for?"

"There is another aspect to the problem," said John. He ignored the question. "Yendle will give us the information we want only when he wants to give it. We cannot take it from him against his will, and he knows it. He also knows that, once we have it, his protection will be gone. The trick, obviously, is to make him want to give it to us."

"You make it sound easy," said Malcome. He stared through the window at the slumped figure on the uncomfortable chair. "Damn the swine! Making us sit here and wait for the blow-up. When I think of all those people . . ." His big hands knotted.

"You'd like to kill him, wouldn't you?" said John softly. The click of the magazine as he thrust it into the pistol punctuated his words. "You'd like to beat him to a pulp with your bare hands. You'd like to take a gun and lift it to his head and watch his face as he screams and begs for mercy, the mercy he is denying to all those decent men and women who are going to die unless he talks. You'd like to kill him because he has beaten you, because he has laughed at you and what you stand for. You'd like to kill him because he is a dirty traitor and not fit to be alive."

He stared into the frosty blue eyes, operated the slide of the pistol, and put the weapon into the colonel's hand.

"Kill him, Malcome. He's no good to us now. Kill him and rid the earth of a little of its vermin. Kill him before he can do any more damage. Kill him . . . kill him . . ."

His voice droned on.

Yendle sat on his chair, his face between his hands, and felt misery tear at his soul. The discomfort of the chair didn't bother him; if anything he welcomed it. He was, though he couldn't know it, in much the same state of mind as an old-time penitent. Pain, physical pain, was welcome to him. Confession would have been an even greater relief, but that was the one thing he could not do.

His survival instinct, as yet, was still too strong.

His hate was even stronger. He hated the people who had done this to him, not his friends, but the uniformed fools who had ruled and ruined his life ever since he was a boy. He was glad that he had them worried; gladder still that they would suffer. He only wished that he could kill them all and so rid the earth of the strutting, egotistical, self-opinionated swine.

He gritted his teeth as he thought about them. Let them hurt him! Let them kill him, even; not that they would. He was safe as long as they didn't know where the bomb was hidden, and they wouldn't know about that until it blew. For some reason he never thought about what would happen after that.

The hate did not last. No emotion could last in his present state, for hate, like love, fought a losing battle against his overpowering depression. He slumped even more on the chair, great waves of self-pity engulfing him like the black tides of the limitless ocean.

It had been a rotten life. Nothing he had done had met with success. He had been dogged every step of the way by

Security, and all because of a couple of mistakes which hadn't even been his fault. It wasn't fair that a man should have to suffer from something he had done in the past. It wasn't right that a thing, done when legal, should be considered illegal after the lapse of years. It wasn't just, and it wasn't decent. And the worst part of it was that no one agreed with him.

Aside from others like him, of course, they knew, they had been through the same mill. They could understand how it was that a man wanted to hit back at the thing which damned him. They felt the same way. It was only justice to cause trouble in return for trouble received. It was the only way a man could get even, when the courts and the police and everyone jumped on him just because he had a bad name. And he hadn't committed a single crime, not one. He would have been better treated had he been a murderer.

He didn't raise his head at the click of the door. He felt too listless to rise to his feet, to follow the uniformed fool into the next room to be asked more endless questions. To hell with him! To hell with everyone. Why didn't they leave him alone?

"Yendle!" The voice was as cold as fate. "Yendle, you dirty swine!"

A hand gripped the hair at the back of his head, jerked, and he stared into a granite face with frosty eyes and a crease for a mouth.

"I'm going to kill you, Yendle!"

A hand swung upwards, a hand weighted with the black bulk of a pistol. The weapon steadied and Yendle stared directly into the muzzle.

Malcome pulled the trigger.

"It worked!" Malcome sat in the office with John and Mark, and sounded as if even now he couldn't believe it. "They found the bomb with thirty minutes to spare. It was

atomic, all right, a hand-made outfit disguised as a tape recorder." He became grim. "Hand-made or not, it would have wiped out Alamushta, the factory and half the inhabitants. The fall-out would have taken care of the other half and about five square miles of territory."

"Did you find out why there was a time-lag?"

"It was set to go off at change of shift and just when a consignment of raw materials coincided with a delivery of finished products." Malcome didn't say what the products were, but John could guess. Alamushta was a new town, one that had sprung up to serve a factory which had been built shortly after the pilot rocket had reached the Moon. It wasn't hard to put two and two together to come out with the obvious four.

"You took a gamble," said Malcome. "If Yendle hadn't cracked . . ."

"He had to crack."

"But you couldn't be sure," insisted Malcome. "I still say that you took a chance."

"What had we to lose?" John sighed as he stared through the window into the empty cell. Yendle had long since been carried away, curled up with his knees touching his chin in the foetal position of dementia præcox. "But it wasn't the risk it seemed. We had all the advantage. Yendle was a national, he was in the transition stage between hysteria and manic depressive, and you sincerely wanted to kill him." He smiled at the colonel. "Incidentally, I must apologise for having hypnotized you."

"Did you?" Malcome looked startled. "I didn't know that."

"It was the only way to get you to go into that cell with the fixed determination to kill." John turned as Mark went to the door and returned with coffee. "It wasn't hard to convince you. You had been working for long hours at high concentration. You had had your hatred of Yendle

and what he stood for sharpened to a fine edge. It was a simple thing to get you to the killing stage, and even simpler to get you to go into the cell. All you did was to do what you wanted to do. All I did was to nullify your censor just enough to permit you to do it."

"I forgive you," said Malcome. He accepted a cup from Mark, stirred it, sipped, helped himself to more sugar. "Yendle talked, anyway."

"Yes," said John soberly. "He talked." He didn't like to remember the frenzied rush of words and the ghastly collapse. He didn't even like to remember the expression on the colonel's face when he had gone in to kill. Yendle had cracked simply because there was nothing else for him to do, but he had paid for it by a desperate retreat into the past.

"The key was survival," he explained. "With an enemy national it would have been different; his personal survival instinct would have yielded to that of his people and country. You could have torn such a man apart before he would have broken. You yourself would be the same. You would make any personal sacrifice for your country because, to you, the survival of your nation is far more important than merely saving your own life. Yendle wasn't like that."

"He was a traitor," said Malcome.

"He was a man without loyalty," corrected John. "The enemy meant nothing to him and he had no patriotism. He was an individual and, because of that, his own survival was of paramount importance." John shrugged. "I am speaking, of course, of the time when you went in to him."

"Couldn't we have used that technique earlier?" Mark leaned forward, his round, nordic face intent as he listened to the doctor.

"No."

"Why not?" Malcome handed John his coffee. "Here, it's getting cold."

"Thanks." John took it, tasted it, drank it down. He

fumbled for a cigarette, found only an empty package, and looked wistfully inside.

"Here." Malcome passed over a fresh pack. "Keep them."

"Thanks." John ripped open the pack, shook out a cigarette, lit it, inhaled with grateful pleasure. "We had to wait until Yendle's hysteria had died and he had begun the swing towards the manic depressive stage. We had to wait until the time was just right for the attack on his survival instinct. Too early and he would have laughed at it; too late and he would have craved for death as an escape from misery. We had to hit him when he was 'normal.' So you took a gun and went in to kill him. He knew you intended to kill him, because you *did* intend to kill him. You weren't acting, you were going to lift that gun to his head and blow his brains out." John drew at his cigarette and stared thoughtfully through the smoke.

"Sincerity is something which cannot be counterfeited. His subconscious recognized your intent and he broke. His survival instinct took over and saved him in the only way possible. But had that gun been loaded, as you thought it was, he would have died before the words could leave his mouth."

"I doubt it," said Malcome. "I gave him plenty of time."

"You gave him no time at all," corrected John. "Both Mark and myself saw you press the trigger. If I hadn't fixed the magazine so that a cartridge couldn't enter the chamber Yendle would have died. It would have been a kindness at that."

"I don't remember it." Malcome frowned. "I knew the gun was loaded, of course. I saw you load it. But that would have provided the best reason of all for me not to fire. I wanted information, not an execution."

"You wanted a dead traitor," said John. "You wanted it so much that it was easy to persuade you to go into that cell with the intent to kill. It was because of that intent that Yendle broke. You provided no alternative."

"So I would have killed him." Malcome admitted. "All that proves is that I hate traitors."

"Yes," said John softly. "But is it normal for a man to hate the very thing he has helped to create?"

The silence was the calm before the storm.

Malcome was a colonel attached to Security, a man who had devoted his life to the furtherance of secrecy and the stamping out of disloyalty. His reactions were both violent and immediate. John heard him out, mentally checking his protests against a list of possible reactions. He was pleased to find that he hadn't missed one.

"Finished?" He lit a fresh cigarette. "Now let's be sensible about this. I am not accusing you, personally, of anything. What you stand for is something else again. Surely, you have noticed that the tighter Security clamps down the higher the sabotage rate mounts? Little things mostly, petty, infuriating little things which, on the surface, seem without rhyme or reason. I am talking of sabotage now, colonel, not treason."

"Anything which hampers our efficiency helps the enemy," said Malcome coldly. "Anything which helps the enemy is an act of treason."

"Therefore, anyone performing an act of sabotage must, by your logic, be working for the enemy." John shrugged. "Any schoolboy could tell you the illogic of such a syllogism. Your conclusion just isn't true."

"A traitor is a traitor," said Mark. "You can't get away from that."

"I am speaking of saboteurs, not traitors, captain."

"They are the same."

"They are not the same. A traitor is, by definition, someone who betrays his country or friends or cause. Sabotage is damage done with deliberate intent. The mechanic who tends your car and, at the same time, damages it so as to make

business, is guilty of sabotage. Even you would hardly accuse him of treason. Yendle was not a traitor."

"Sophistry," sneered Malcome. "Perhaps we should have given the swine a medal for planting that bomb."

"It would be better if we tried to find out why he wanted to plant it in the first place." John slapped the dossier before him. "The reason is in here. Yendle was hounded all his life by Security for being a suspected subversive. There was nothing against him but the fact that he had once donated some money to an authorised fund, had read a book later proscribed, and had tangled with a long-hair movement for world peace. We did the hounding, colonel. We are to blame for what Yendle became."

"There can be no possible excuse for a man becoming a traitor," said the colonel stiffly.

"I disagree. A man can only be loyal to something he believes in and, if his loyalty has been crushed, then how can he be accused of disloyalty? What cause did Yendle have? What interest, other than the accident of birth, did he have in this country? He was treated worse than any criminal for actions which, in themselves, were harmless. Is it any wonder that he wanted to hit back?"

"You are tired, doctor," said Mark hastily. "You've been up all night and have been working under a great strain. You'll feel better after a good rest."

"Yes," said John dully. "I'll feel better, but nothing can alter the facts. We are a democracy founded by a freedom-loving people who, remember this, gained their freedom by revolt against authority. We are still called a free people. We permit freedom of speech—on paper—and then penalise a man for using it. We claim religious and political tolerance—and you know how empty that boast is. We tell our people that they are adult—and then force them to wear blinkers for fear that they should know too much. We claim internal equality for all peoples—and have lived with that lie for a hundred years."

"We are a free people," said Malcome. "But we are at war, and in time of war the individual has to relinquish some of his rights for the common good. Security has to be hard. Better a few people should suffer a little inconvenience than run the risk of men like Yendle destroying us."

"A little inconvenience?" John smiled but his eyes did not smile. He was treading on dangerous ground and he knew it. It was better to shut his mouth, to let things ride, to ignore the facts which his training had found in all the reports and investigations, the mounting suspicions that all was not as it should be. Psychological engineering was a thing understood by few, and certainly not by the military. But a man had to try.

"You hounded Yendle all his life," he said. "He was on your lists as a suspected subversive, and yet that did not prevent him from planting the bomb. The only possible justification for such persecution was to prevent what actually happened. Maybe if we had trusted him a little more, given him a stake in the country he lived in and was supposed to live for, he wouldn't have wanted to do it. You can't treat a man like a dog and expect him not to resent it. Not when our history and culture rest on the belief that every man is as good as his neighbour. We gained our freedom by a revolt against authority once, remember. The same spirit is alive today."

"Rebellion?" Malcome was genuinely shocked. "Impossible!"

"Nothing is impossible, colonel," reminded John tiredly. "Only highly improbable."

"It's an interesting theory," said Mark. He reached towards the tray. "Have some more coffee, doctor. Black, isn't it?"

"With plenty of sugar." John smiled, grateful for the help the captain was offering, but he knew that it could do no good. He had gone too far, said too much, and Malcome

would not forget. But it wouldn't hurt to keep up the pretence.

"The rebellion has already started," he said quietly. "Small rebellions, but all the more annoying because of that. The saboteurs who, without really knowing what they do, or why they do it, are causing so much trouble. They aren't traitors, colonel, though we execute them as such. If there was a real, fighting war, they would be the first to volunteer. I like to think of them as patriots fighting for a lost cause. They are fighting for freedom."

"Nonsense." Malcome seemed about to say more but thought better of it. "If it wasn't for Security, this nation would be overrun with enemy agents and our freedom lost." He snorted. "Anyway, even allowing the possibility of your . . . theory, what could we do about it? To be effective Security must be stringent. We simply cannot afford to take chances, and the only way to achieve that is the system we use."

"It is small consolation for a man to be thrown into jail because of the possibility that the man in the next cell might, one day, commit a crime," said John.

"Perhaps." Malcome wasn't interested. He glanced at his wrist, gulped his coffee and rose to his feet. "It's getting late, almost dawn. Will you be sleeping here, doctor?"

"No, thank you, not if I can catch a plane back."

"There's one at dawn," said Mark. He yawned and rubbed his eyes. "I'll be glad to get some rest. We've all been under a terrific strain, and the sight of Yendle after his collapse wasn't very nice." He yawned again. "Funny how your mind works when you're tired. I remember one time, just before some examinations it was, that I dreamed up an entire scheme to gain control of the world." He laughed, self-consciously. "It was just one of those weird ideas you get."

"Like saboteurs being patriots?" said Malcome. He smiled. "I understand." He held out his hand to the doctor.

"Thank you for all you've done," he said sincerely. "I don't have to tell you how grateful we all are. If it hadn't been for you an entire town would now be radioactive ash." He chuckled. "Think of that the next time you grow tired, doctor. It may serve to show how fragile your theories are."

"He won't report it," said Mark, after the colonel had gone. "But, man, do you take risks!"

He wasn't joking.

The plane didn't leave at dawn. An inspector had discovered a couple of cut wires and the skyliner was grounded for two hours for inspection and repairs. John spent the time reading, thinking, and wondering how it was all going to end.

Moving a mountain was hardly a job for one man, but sometimes he had to try.

Even though he could only get hurt.



LEST WE FORGET

by ROBERT PRESSLIE

*A MACHINE WORKS STRICTLY ON LOGIC. A
CRIMINAL, KNOWING THAT, COULD EASILY
BEAT A MECHANICAL JURY*

THE JUDGE, WHO WAS NOT A JUDGE, OPENED THE proceedings with the customary question. "Niven Boyd," he said. "How do you plead? Guilty or not guilty?"

Boyd answered: "Guilty."

And the judge, who was really a cybernetics man, translated the reply into the proper symbols and tapped the appropriate keys on the console at which he sat.

Boyd watched him with a smile that was sour, cynical and yet wary. As a trial—it was going to be a lie to call it thus. There was no proper judge, no jury and there were no witnesses. It was sheer mockery to hold the trial in the building with the statue outside which held aloft the scales of justice.

In place of a judge there was Kirsch with his busy fingers. There was Niven Boyd, the accused. And the only other living soul in the courtroom was the prosecutor. Even he knew little about law; he was neither clever with questions nor over-bearing in appearance. He was just an old man who knew Boyd intimately. It was the prosecutor who put the next question.

"You admit to murdering Owen Michaels?"

"I do. I hated the professor's guts."

The judge, Kirsch, cut in: "Confine yourself to answering the question. Don't elaborate. And I would advise you to frame your replies in precise factual terms. Do you wish me to inform the jury that you were antagonistic to Professor Michaels' intestines?"

Boyd didn't think it funny. "What jury?" he asked, waving a hand at the empty courtroom. "This is ridiculous. Why should a man's future be decided by a mass of transistors which are not even here, but are in a building a mile away?"

"Juriac is infallible," said Kirsch. "Its propinquity is irrelevant. It is linked to this keyboard."

How infallible, Boyd wondered. How infallible could a computer be? He wondered also who had juggled with the English language until they found a sequence of words whose initials would spell out JURIAC. He knew somebody had. But that was his trouble, that was one of the reasons he was there; he knew too much.

"I disliked the professor," he said flatly. "And you will have to take my answers as they come. It's up to you to make them intelligible to your electronic jury."

Kirsch didn't touch the keys until he had put a question. "You disliked him. You are twenty-four years old, you were adopted by Owen Michaels soon after birth, you spent your lifetime in his care—yet you say you disliked him. That doesn't make sense."

He turned to the prosecutor. "You should have made that point, not me."

The old man smiled apologetically. "Of course. Niven—Niven Boyd, I think it would be best if you would describe briefly, but accurately, the events leading up to the death of Owen Michaels."

Boyd studied the ceiling before answering. "I can't be brief. I have to go back a long time."

"How long?" Kirsch asked.

"Twenty-four years," said Boyd, and the judge's fingers began to move.

"Perhaps," Boyd amended, "I should go back a year more. However, I can't be precise as to how much earlier than my adoption it was when Professor Michaels first decided there was a shocking waste of human knowledge."

The prosecutor was patient. "Begin where you are sure of your facts."

"Twenty-four years ago——"

"One moment," the judge interrupted. "At that time you

were a suckling infant. How can you be sure what happened then?"

"That," said Boyd, "is exactly why I killed Michaels."

Kirsch lifted his hands off the keyboard in despair. Then he swallowed whatever he had been going to say, grimly ordered Boyd to carry on and hunched himself over the console.

Boyd stuck to his point. He was a baby when it all began.

Michaels had been a teacher. Academically, he had merited a superior title, but at heart he was simply a teacher. The imparting of knowledge was his life, his love and his particular gift.

In middle life he was struck by the appalling truth that everything he taught would, in the end, be wasted. Every undergraduate who passed successfully through his hands went out into the world armed with all the professor's wisdom plus the ability to learn more, to absorb the wisdom of centuries of geniuses, from Euclid to Einstein. But when each and every pupil had lived his life and had added to his private store of wisdom, all of it would be lost. Death would wipe the blackboard clean. And the next generation, the next batch of pupils, had to learn again from the beginning.

Owen Michaels' favourite pupil had been Niven Boyd's father. Boyd senior had been fit to rank among geniuses. He had made great theories, great contributions to the world of science. Greater things had been expected of him. But he had died in a plane crash with his wife, leaving an infant son.

Michaels had grieved more than anybody. He could only guess at the half-formed truths nebulating in Boyd's head when he died. He wept, not so much for the loss of a friend, as for the tragic loss of knowledge, the wasted years of pounding it into Boyd from ABC to alpha, beta, gamma—particularly gamma.

He made a vow, then, that it would cease to happen. He was going to see to it that this business of learning from scratch was unnecessary. After all, if animal instincts can be passed from generation to generation, why not also acquired knowledge?

He began by adopting Boyd's baby son.

Kirsch raised a hand. "Hold it," he said. "You talk faster than I can transcribe." He pecked at the keyboard a while and said: "So far, so good. Any questions, prosecutor?"

The old man shook his head. Then he changed his mind. "I think we had better get the source of this information on record. It is relevant. Niven, how did you learn what you have just told us? Was it told to you by the deceased or did you find it among his papers?"

"Neither, sir. It was not necessary. Everything that Owen Michaels knew, I know—and have known for more than twenty years."

"Can you, then, give an account of what steps the professor took to conserve knowledge?"

"Certainly, an exact account."

Kirsch warned: "Not too fast, please."

At the time when Niven Boyd had been made an orphan there was in existence a recent, but widely accepted method of teaching—or of learning, rather. It consisted of the pupil, while asleep, having facts and figures repeated to him over and over from a recording. The theory behind the method was that in sleep there were no visual or other physical diversions, and the mind was completely free to absorb facts.

Owen Michaels' adaptation of the method was simple and direct. He prepared a recording of every single thing he knew, everything he had experienced, everything he had ever thought.

Boyd noticed that the judge had not started to use his console again. He asked: "Am I doing it wrong?"

"Not at all," said Kirsch. "But so far you have been talking of abstracts. *Know, think, experience*—the semantic symbols for these complex. I'm waiting for factual data."

There may or may not have been pity in Boyd's smile. "I hope you don't get lost," he said. "I'll give you facts."

Simple as Michaels' method was, it necessitated the assembly of new apparatus. And yet there was nothing revolutionary about what he did. He just borrowed known techniques and suited them to his own purpose.

For two reasons he could not record on conventional tape. For one thing, it would take too much time, and for another,

he wanted to be certain that nothing was omitted from the recording. Therefore, he made the recording on a six-inch square of sponge platinum on the surface of which there was a molecular film of cobalt-sixty. With an emitron camera functioning at one million lines, he had nearly everything he needed.

The sleep technique was not selective enough for his purpose. He got over this by devising hair-fine electrodes intended to be seated directly in the memory centre of the brain.

The trickiest part was making the actual recording. Working in front of a triple-angle mirror, he shaved a patch on his skull, drilled an almost invisible hole in the bone with a painless Beaujolais cold-point drill and planted the electrodes.

After that, he lay down and waited for sleep. He shunned hypnotics to avoid blocking off any part of his memory.

In dreams, a life-time can be lived in a fraction of a second. Michaels was hoping for a similar total and instantaneous release of memories from his brain cells.

He was not disappointed. Active thought entails minute electrical impulses in the brain. Memories exist as potential differences. Each memory cell is like a charged condenser. A sudden recollection of an old forgotten incident is nothing more than the electrical impulse derived from the discharge of the respective cells. But unlike condensers, the cells are self-charging; as the recollection stems from discharge it also requires active thought about the memory and this recharges the brain cells.

"That," said Niven Boyd to the judge, "was Owen Michaels' own interpretation of what happened. The practical results seem to verify his theory."

"Go on," said Kirsch.

"He had an extension of that theory. He believed that in sleep each and every memory cell is discharged and recharged—which explains a lot about dreams; how they are jumbled memories put together in haphazard order with quite freak results."

Kirsch was impatient. "You were saying something about practical data——"

"I'm coming to that. While Owen Michaels slept, his entire life-long memory was recorded on the platinum plate. With the discharge of each unit cell an impulse was picked up by the electrodes resting in his brain. Wires from the electrodes carried the impulses through a series of coils and transistors to the emitron gun. The amplified impulses put kinks in the straight lines which the gun was tracing on the cobalt screen. And that was it."

"That was what?" asked Kirsch.

"The recording. Michaels had a nifty grating in front of the screen which occluded the straight lines—but nothing else. In other words, only the kinks reached the cobalt-sixty screen. Cobalt-sixty is radioactive. The kinks from the emitron gun killed it—not entirely, of course, but where the screen was reached by the gun, the half-life of the cobalt isotope was reduced by a measurable fraction of time."

Kirsch was busy at the keyboard for quite a while. Eventually, he looked up and nodded to the prosecutor. The old man took his cue.

"Presumably," he said, "you will now tell us that the deceased was able to play back this recording?"

Boyd said that was so. A few changes here and there and it was done. The grating was replaced by layers of foil; just enough foil to stop the emanations from the partially de-activated cobalt, but not the emanations from the unaffected isotope.

The emitron gun was re-wired as a scanning tube. When it traced the cobalt screen there was a kick of current every time it crossed a point where there was no radioactivity, the spots where the cobalt had been partially killed. The impulses were fed back to the electrodes——

"—— and the electrodes were buried in my head!" Boyd finished. "I was too young to protest, too young to say it shouldn't be done to me. But it was done. At six months of age, I suddenly knew more than most men know when they go to the grave!"

The prosecutor seized on Boyd's words. "Therefore," he said, "therefore, you murdered Owen Michaels because of a life-long resentment at something he did when you were a child."

"I didn't say that. You're quite wrong."

"Do you deny killing Michaels?"

"I've already admitted to it."

"Then why? He was your benefactor, your father, almost. You wanted for nothing. What was his was yours for the asking——"

"Except his mind. I got that without asking."

"Is that so bad?"

Boyd breathed heavily down pinched nostrils. "So bad? Have you any conception at all what it is like suddenly to have a man's entire wisdom thrust upon you? Can you imagine a baby sucking its thumb while it ponders over the awful consequence of an equation like $e=mc^2$ and hating itself at the same time because it knows the Freudian, the neo-Freudian and all the other explanations for why it is sucking its thumb—and also worrying about what complexes it will develop *because* it knows the Freudian and neo-Freudian and all the other theories about what happens to people who stoop to self-analysis? Have you even a glimmer of what it was like for me?"

He warmed to his theme. "I've lived my life in emotional agony. The professor was not a lecherous man, but he was a man. Imagine how I suffered as a child when I looked at a woman with a man's reactions and shrank with shame at my own inadequacies. Picture me a little older—a boy of ten, full of curiosity, eager to delve into science. With my knowledge it should have been a delight. But it was frustration. There were no boyhood experiments for me; I knew all the results. I knew which avenues led to blind alleys. There was no joy of discovery."

The prosecutor halted him. "Is it not true that you have had published some thirty papers which have been acclaimed as the most outstanding work of the decade?"

Boyd admitted it. "But that was recently. Can't you see that everything planted in my brain was useless until I had matured? I couldn't use all my wisdom until I was a man, until my mind was mature enough to use that wisdom as a stepping stone. Before then, all through my childhood, I had a head full of facts which I knew could be used, but which I also knew I was not fit to use yet. I repeat, it was utter frustration."

The prosecutor seemed satisfied. "So," he said, "it really was resentment that was your motive for killing Owen Michaels."

Boyd got angry. "No!" he exploded. "It was not. With his mind I also had his balance. You wouldn't say Michaels was a hasty man, would you? He was anything but that. His decisions were slow and deliberate. And if he thought of doing something, meditated over it until he reached the conclusion it would be wrong, he decided against doing it."

He sighed and was calmer. "I will admit that once I did think of killing the professor—for the reason you give. But, like him, I deliberated and decided not to."

"Yet you did kill him!"

"But not for that reason."

"Then why?" the prosecutor asked again.

Kirsch interrupted before Boyd could answer.

"Before you go any further, let me get this straight. You've certainly given me data—a welter of it, and much of it technical. But as far as Juriac is concerned a lot of it is irrelevant and I've boiled it down to one sentence. Before I feed the sentence to Juriac I want to know if you agree that it sums up your statement fairly. What I propose is this: 'Basic facts and methods for their co-relation were implanted by the deceased in the memory units of the accused soon after his creation.' Will that satisfy you?"

Boyd didn't look as if he cared. Yet there was a note of wariness in his voice as he asked: "What's wrong with calling it birth? Why call it creation?"

"Creation is the word that Juriac uses. It is a semantic Comprehensive; that means it covers everything from unicell

fusion to germination from a seed, hatching from an egg, live birth or even the evolution of a rabbit hutch from wood and nails."

"I'll pass it," Boyd agreed.

"You understand that it is the second fundamental? The first was your plea of guilty. Do you want to deliberate?"

"Let it go."

Kirsch accepted him at his word and punched out the statement in symbols. When he was ready, he gave the prosecutor a signal to proceed.

"I was asking," said the old man, "what motive the accused had for killing Owen Michaels."

Boyd looked him straight in the eye. "I had no motive. It was self-defence!"

"Please!" said Kirsch. "In the preliminary report in front of me—and of which you have a copy—it clearly states that you killed Owen Michaels in his sleep. I find your plea of self-defence untenable."

Boyd's contempt was open. "You're not in a position to find anything, and don't forget that. You may be sitting where a judge normally sits, but as far as this case goes you're not much more than a typist."

Kirsch was quick to hit back. "If this court was properly constituted, you could have been jailed for that statement alone! However, I know you well enough by this time. No doubt you have information which you believe to substantiate your plea?"

There was a frown of doubt on Boyd's face. "I have," he said. "But it has just occurred to me that I have no proof. There is only my word."

"Assuming——" said Kirsch. "Just assuming for the moment that you *did* murder Michaels, and that it *was* self-defence, would you be prepared to submit your substantiating evidence to a lie-detector?"

"Certainly."

"Let me hear it first. I will decide what to do about it afterwards."

Boyd admitted that the professor had been asleep, and repeated that the murder had been committed in self-defence.

"Because," he said, "he intended to kill me next day! We were as one, remember. What he knew, I knew, and what I was feeling he could guess at with great exactness. For over twenty years he had realized the emotional stresses which were tearing at me. For over twenty years he suffered torment because my agony was his doing. He could see only one solution—to put me out of my agony."

Boyd tapped his chest. "But I forestalled him. I could see his torment. I could even deduce just when he would decide to do the obvious thing. You see, our minds were so alike. And while I didn't have the ability to think one step ahead of him, I was lucky in that he decided to kill me, not at the moment of decision, but next day. As I said, I was able to forestall him."

Kirsch did not erupt as Boyd half-expected him to. Instead, he smiled derision. "Unique, quite unique! Prosecutor, surely you will not accept this preposterous story without challenge?"

The old man was confused. "Well . . . I'm not sure."

"Self-defence," said the judge, "implies hasty action. It is impulsive, spur-of-the-moment. I am prepared to accept that Niven Boyd committed premeditated murder. I can't accept a plea of premeditated self-defence!"

"You'll have to!" said Boyd. "I didn't come here unprepared. I can quote two cases where the same plea was held valid. In one instance, the accused overheard his own death being planned; in the other, an entry in a diary was discovered."

Surprisingly, the prosecutor backed him. "I know the cases to which he refers. He's right."

Kirsch was loth to let go. "— if Michaels really did intend to kill him first."

Quite firmly, the prosecutor said: "Take it as true, Jacob. You agreed not to quibble about things like this."

And Kirsch collapsed. "All right," he said. "How will this do? 'Knowing that his teacher intended destroying him, the accused destroyed his teacher'."

Boyd and the prosecutor both nodded assent. Kirsch punched out the third fundamental. Then he pressed the integrating key.

Despite its contrived name, Juriac was basically a computer. It was in possession of the three fundamentals and with these, and the subsidiary data, it should have been able to make an immediate integration and deliver a verdict.

It stalled for a full ten seconds.

Kirsch stabbed the integrating key again. For good measure he repeated the fundamentals.

Juriac became vocal. Its vocabulary consisted of three words; more were not required. It used two of them.

"Not Guilty!" said the manufactured voice. And it kept on saying it.

Kirsch looked questioningly at the others, uncertain whether he should cut the power.

"I'm guilty!" Boyd shouted. "That was the first fundamental. I'm guilty. The accused admits his crime. The accused insists he killed the deceased. Tell that to your Juriac."

The three men crowded round the keyboard while Kirsch frantically stabbed out the first fundamental over and over again. He might have been trying to recall a telephone operator for all the effect his efforts had. The canned voice kept up its mad recitation. "Not guilty, not guilty . . ."

Kirsch flipped the power switch. He turned to the old prosecutor and filled in the silence. "You win, Owen," he said, defeated.

Michaels touched his shoulder. He said: "It doesn't give me any particular satisfaction. You put in a lot of hard work on Juriac and it's always a shame to see hard work go for nothing. But it should have been obvious, Jacob, that people would never allow a machine to decide their fate unless it was absolutely infallible. I admit that the case which Niven and I cooked up was unique, but it was deliberately chosen that way. We had to know if the machine would reject evidence—in this case a plea of guilt—if the total evidence,

added up to something similar to a position in which Juriac itself could be."

"The result is what you predicted," Kirsch agreed. "But I can't see how it happened. I didn't build in self-preservation impulses."

"You built in self-repair units, Jacob. That was enough. What is the purpose of repair if not for preservation? You've seen for yourself. The second and third fundamentals could have applied to a computer just as well as they did to Niven. You gave Juriac basic facts together with methods for correlating them; and if you had told Juriac that you intended destroying it, it would have felt justified in killing you first—which, fortunately, it does not have the ability to do."

Boyd took it from there. "Even with my confession of guilt, your computer decided I was not guilty. As the professor said, when it comes to a matter of self-preservation Juriac classes murder as justifiable. It looks as if we'll still have to use twelve good men and true."

Kirsch was resilient. "All right, boys, you win this round. No hard feelings. I'll see you tomorrow and we'll thrash out a report then. Meanwhile, I'd better collect my gear before handing the place back to the law. See you tomorrow."

Outside in the street, Owen Michaels had something private to say to Boyd. "Niven," he said, round the stem of his pipe. "Was it really so bad?"

Boyd didn't have to guess what he meant. "Growing up?" he said.

Michaels waited for an answer.

"Let's not talk about it," said Boyd. "That's all behind me now. I've got over it."

"Have you? Really? I mean—is there no resentment? Is there any possibility that the story which we distorted today could ever happen that way?"

Boyd laughed. It was a quick and short-lived laugh. "Not until I'm sure of a tin jury!" he quipped.

But as they walked up the street together, Michaels was silent. He wondered why Boyd had reddened.

The Evolution of Man

by Kenneth Johns

Part 2—THE DRAMA BEGINS

THE WEIRDEST NATURAL PHENOMENON ON ALL EARTH is LIFE. Difficult to define and requiring a fantastic amount of work to analyse, life has so far still defied every attempt made to synthesise it.

The origin of life, known as biopoiesis, has intrigued men for thousands of years and resulted in more theories to account for it than has the origin of the Earth. Until the coming of the scientific method, the problem was inextricably complicated by the idea of a "vital force," the breath of life.

Most of the older theories were founded on confident ignorance. Science still has not completely solved all problems connected with life's origins; but such impressive advances have been made very recently that the picture is reasonably clear. Extrapolation from thousands of observations in the last few years has given us more insight than the dogmas of religion and philosophy revealed over thousands of years.

Whether or not there was a Prime Cause of life is a matter for metaphysics—the actual mechanism of life and its beginnings is in the province of the scientist and can be dealt with by the scientific method. And even if life was planned by higher beings, its origin could well have come about from the basic structure of the Universe, commencing with the continuous creation of hydrogen.

It is now thought that life is a natural concomitant of the presence of sufficient hydrogen, evolving automatically through galaxies, stars and planets, to living organisms. Hoyle has shown that planetary systems are not rare; every slowly-spinning, medium-sized star must have a family of planets graduated in composition and size very much as is

the Solar System. He estimates that there are 100,000 million such stars with planetary systems in our Galaxy alone. If only one system in a hundred contains an Earth-like planet—and the odds are probably better than that—then there are 1,000 million fresh homes waiting for us. Except, of course, that, according to the latest ideas on the origin of life, most of these planets should harbour some form of living organism waiting for us.

Even whilst the dust particles were condensing from gaseous rings around the Sun and were drawing together to form the planets in that initial shock of creation, the first stage of the evolution of life was being enacted. The harsh ultraviolet and short wave radiation from the Sun smashed into the thin haze of water, carbon-dioxide, methane and ammonia gases, breaking them into small, active fragments. The enormous surface area of the dust particles with their viscous coatings provided just the right medium for recombination of the split molecules. They joined to one another, forming larger and more complex molecules.

The intense light broke these down again in turn and a steady flux of formation and decomposition was reached; but, even so, in the gigantic volume occupied by the dust clouds there was an extremely good chance that some crude form of life was formed.

Whether any of these did live to reach the surface of Earth and survive is a matter for conjecture. We do know that the oldest rocks so far discovered on Earth were solidified about 4,000 million years ago. This was determined by analysing them for the various isotopes of lead and uranium. U 238 disintegrates to lead 206 with a half-life of 4,500 million years and, with this fact as a basis, the age of the rocks was calculated.

In all the rocks laid down between 4,000 and 800 million years ago, not one trace left by life has been discovered. In strata laid down 800 million years ago there is evidence that bacteria then existed. Deposits of iron oxide and sulphur

found in these levels could only have been produced by bacteria-like life. The sulphur was formed by the reduction of sulphates, the heavy isotope being partly separated from the lighter isotopes of sulphur, and the descendants of these bacteria—or similar strains—still exist on Earth and are the only known natural means by which this isotopic enrichment can occur.

The earliest forms of life had no bones or shells to leave their fossil imprints in geological strata; but we can estimate roughly that the first life existed on Earth 1,000 million years ago. To answer the question: "How and where did that life originate?" is to plumb the depths of human knowledge, experience and *raison d'être*.

It has been suggested that life is a natural adjunct to all forms of matter. Lord Kelvin and Arrhenius postulated that spores of life are spread from planetary system to planetary system, escaping from atmospheres and propelled by light-pressure from stars throughout the Galaxy. The proof of this must wait until we can microscopically examine the dust on the Moon. Certainly this theory begs the whole question of the origin of life merely by transferring the scene to other planets.

Most scientists now prefer a more basically probable series of events than have been previously put forward—a building up from simple to complex structures which, given the right conditions, *must* occur.

Life came from the sterile seas and rocks of Earth. It came, not with a sudden dramatic explosion, not creeping, crawling and swimming; the first life floated serenely in the warm shallow seas, mindlessly anchored to particles of mud and sand. The surface of fine particles was essential to concentrate the complex structures as they were formed, structures that, even today, we would have difficulty in recognising as being alive at all. But this new thing in the world had one vitally significant characteristic not possessed by any other single thing. They were just groups of a few million molecules—but they could organize.

Organization is the one factor that distinguishes living from non-living material; but there is not a sharp boundary, only a gradual gradient with all types of intermediate complexes.

Life is not growth and reproduction alone, for crystals can grow and reproduce. Life is not the ability to catalyse, or increase the speed of chemical reactions, for many metals will do this. Living organisms do grow, they do multiply and they do act as catalysts; but they combine these functions. They organize chemicals into food, splitting them down or building them up as necessary, and they then organize the food for building up their bodies and for reproduction.

Life creates organization out of chaos, reversing the general thermodynamic tendency of the Universe to reach a lower state, a state of disorganization. Living organisms also adapt their growth towards a mature state.

When the Earth had at last settled down to become a stable planet, a noxious atmosphere clung to it. The air, unbreathable by us, contained carbon-dioxide, ammonia and methane swirling over the rocks like a vast witches' brew stirred by the winds and activated by the Sun's ultraviolet light. There was no ozone layer in the upper air to screen the surface because there was no oxygen from which to obtain ozone. Near the surface thick clouds roiled turbulently over the seas and continents, absorbing much of the light.

For 3,000 million years there was little apparent change. Probably every 250 million years or so there was a period of mountain-building as the continents rose, followed by the inevitable glacial period lasting a few million years. We can find firm evidence for only the last five glaciations; but there were other such periods. Mountains grew, were eroded and then rebuilt from their debris. Between each periodic upheaval there were long, quiet summers lasting for 200 or more million years—summers in which deserts and lakes covered the arid continents.

For more than 3,000 million years the only green on Earth was around outcrops of copper minerals—the complicated chlorophyll molecule, and the green hills of Earth were far away in the future.

But, in subtle contrast to this tranquil scene, there were restless, hidden changes. The seas washed much of the salt out of the lands and the fierce ultraviolet light continued to beat down. As in space, the molecules it smashed recombined, but now they were washed out of the air into the seas. There, protected from the Sun, they were absorbed on particles of mud and clay.

These fragile fragments were the precursors of life. To trace exactly what would happen under like circumstances, American scientists made up an artificial mixture of methane, ammonia and carbon dioxide corresponding to the primeval atmosphere. They then activated the mixture with electrical discharges similar to the effect of ultraviolet light. Analyzing the products, they found alpha and beta alanine together with glycine—three of the basic amino-acid components of protein, the key structure of living creatures.

The next stage in the production of life demanded a commodity scientists do not have enough of—time. At the same time as the amino-acids were being formed on the primeval Earth, the solar bombardment by ultraviolet energy created metastable molecules in the air—molecules needing only a trigger to release their excess state of energy—and these formed the first foods; even in those days the Sun was the ultimate giver of energy.

In course of time, the triggers came into being. The endless movement of air and water brought the amino-acids together. Sugars and phosphorous salts were also there—all the constituents of living matter. These trigger chemicals were not life; although the proteins formed contained 300 to 400 amino-acid groups, they were still not complex enough. They were enzymes, still duplicated in our bodies, capable of taking energy from the metastable molecules.

Millions of molecules of this type were formed throughout the eons, and most were unsuccessful; they did not survive. At this stage of the dawn struggle of life they might be said to have died before they were born, died before they were even alive.

Inevitably, however, some of them linked together in the same way their basic units, the amino-acids, had done, forming more complex chains. This chain-building was not fortuitous. All amino-acids have a positive electrical charge at one end and a negative charge at the other, and unlike charges always attract one another; the chain formation was thus forced on the molecules. Some chains were stable enough to exist for long periods.

All chains of proteins are built up from large numbers of the 22 simple amino-acids; but the possible arrangements are infinite. Once a thousand or so atoms were grouped together in this way they formed a large enough group to bind a thick (several molecules thick) skin of water around themselves, thus forming the first membrane.

A few of the organic catalysts joined together occasionally to form a single more complex molecule, sometimes binding in the sugars and phosphorous salts also in the vicinity, thus adding nucleic acids to their structure. Whether this occurred in the seas or on the sea shore is uncertain; but what is important is the fact that it took place on the surface of mud particles. Their combination widened the range of catalytic activity of the complex, but it was still not life, although approaching very closely to it. Biochemists call it sub-life. Some complexes lasted for seconds, some for years, and other were continually being formed.

Then some of these joined, stringing together in a chain wound like a helical spring round a central rod. Other complexes existed in symbiosis, one utilising the products of the other.

Occasionally, a few of these clumped together, joined as if in mating, and had the ability to reproduce themselves. They

used their bodies as moulds, around which similar structures to themselves could form from other complex molecules.

Thus they reproduced—and there was life on the surface of the Earth.

It happened not once, but many times. These new-born elementary forms of life had no predatory brothers, their only danger lay in their environment. Too much sunlight, too little food or too little water would kill them much more easily than modern life. Food was in the waters around them and there was little competition at first, probably different types needed different food molecules. Life grew and multiplied, spreading over the seas and along the shores.

In time it spread so much that food became scarce. Mutations caused physical changes in some strains, and these became more successful, survived and multiplied. The very specialized types tended to be submerged by the more adaptable strains using alternate food supplies. So natural selection began its momentous task of moulding the form of life.

The first types of life were simple single cells. Biochemists are still trying to trace the structure of this life back in time and down into the microcosm. They know that identical enzymes activate alike simple yeast cells and our complex brains. To them, viruses are the nearest living relation to the missing link of early life.

Viruses are living yet not living. Given the correct complex organic compounds they will grow and multiply; but they can be crystallized as easily as inorganic salts. They contain only a few hundred thousand molecules and are about 100,000th of an inch long, but within them are all the mechanisms needed for reproduction.

The tobacco mosaic virus was the first isolated as crystals twenty years ago. Only at the beginning of 1956 was it found possible to determine its inner structure. At the University of California scientists were able to split the tobacco mosaic into two parts, an inner rod of nuclei built up of nitrogen,

phosphorous and sugar, and an outer spiral of protein. The protein was broken up into smaller chains, but, even so, biochemists found that these would recombine around a nucleic acid rod to recreate a living virus. What is more remarkable, they were able to combine the protein from one type of virus with the nucleic acid from another type, tailoring a new, living virus able to grow and reproduce. The greater part of the characteristics of the offspring of new viruses were fixed by the nucleic acid, the hereditary molecules; but there was sufficient difference between the old and new species for scientists to claim that they were one step further towards the creation of life.

The first, living virus-like organisms in the primeval oceans adapted and mutated, expanding in size and ability to utilise different food sources. They were not animal or vegetable, but an intermediate, humble organism similar to the Protista group of today, the division containing bacteria. In that period of the Earth's history there was no free oxygen, the bacteria were anærobic types such as are found in the mud of the deepest oil wells.

The purple bacteria, *R. Rubrum*, will produce carbon dioxide and hydrogen from amino acids and can take raw nitrogen from the air to fix it in more reactive molecules. Another anærobic bacteria, *Desulphovibro*, will reduce sulphate to sulphur and the evil-smelling hydrogen sulphide gas. Yeast, a more complicated anærobic form of life splits sugar into carbon dioxide and alcohol, a fermentation similar to early life's digestive processes.

Through actions similar to these, bacteria colonized the land areas. They were the first to do so, and began the existence of life on land, enriching the sterile sands that would later be taken advantage of by the plants. Already, life was changing the world to suit its own ends.

The bacteria evolved into the Flagellata and at last life became mobile. Using a long thin tail they lashed their way through the water. These were still neither truly animal nor

vegetable. Plant cells have membranes of cellulose around them and contain chlorophyll, the green pigment which directly absorbs energy from sunlight and passes it on to other molecules in the cell for the photosynthetic use of simple molecules. In contrast to this, animal cells have walls of protein around them and absorb their food, fairly large organic molecules, through these membranes.

At this early stage of life, a type similar to *Euglena* must have developed so that it was both animal and vegetable. *Euglena* uses both modes of obtaining energy and building up its body. Normally, it uses photosynthesis, but when kept in the dark is quite happy to feed in an animal way.

From this in-between life came all the plants in the sea and on the land, and all the creatures that swim and crawl and fly.

The great drama had begun.

SUGGESTED FURTHER READING

- 'Origin of Life,' *Scientific American Reader*, 1953.
 CARRINGTON, R. *A Guide to Earth History*, 1956.
 "The Origin of Life,' *New Biology* 16, 1954.
 MILLER, S. "A production of Amino-Acids under Possible Primitive Conditions,' *Science*, 1953, 528.
 HOYLE, F. *Frontiers of Astronomy*, 1955.
 JONES, SIR SPENCER. *Life on Other Worlds*, 1952.
 STRUGHOLD, H. *The Green and Red Planet*, 1954.
 FRAENKEL-CONRAT, H. 'Rebuilding a Virus,' *Scientific American*, June, 1956.
 MIRSKY, A. 'The Chemistry of Heredity,' *Scientific American*, February, 1953.
 LINDERSTROM-LANG, K. 'How is a Protein Made?' *Scientific American*, March, 1953.
 KAMEN, M. 'Discoveries in Nitrogen Fixation,' *Scientific American*, September, 1953.
 GAMOW, G. *One, Two, Three . . . Infinity*, 1947.
 GAMOW, G. *Biography of the Earth*, 1941.
 BROOKS, C. *Climate Through the Ages*, 1949.

LUCKY NUMBER

by H. PHILIP STRATFORD



JOHN MORTIMER

SOMETIMES NUMBER THIRTEEN NEED NOT
BE AN UNLUCKY NUMBER. NOT WHEN THE
THIRTEENTH ATTEMPT BRINGS SUCCESS

AFTER THE ELEVENTH MULTI-MILLION-POUND ROCKET HAD finished up as a pile of smoking scrap they called in Willard Webley. He boarded a jet in London smog and left it two days later in the scorching heat of Australian summer. He'd been called away from some most fascinating research into radiobiological damage and was in a foul temper.

Branigan, the project director, showed him photographs of the R-11 wreck. Webley's long, grimly-lined face did not change expression; but a muscle jumped under his ear like a scalded cat.

He handed the photograph back and lit a cigarette. His fingers were brownish-red with nicotine stain. "I ought to tell you, Branigan, that I wasn't altogether happy about coming out here——" he began.

"So I understand, Webley. But in the circumstances——"

"Perhaps I've seen too many crashes, too much of death. How old was the lad who was killed?" he snapped unexpectedly.

"The pilot?" The director looked baffled. "Why, I don't know."

"D'you know his name?" The contempt in Webley's voice was unmistakable.

"I don't think that is important," Branigan said stiffly. "It has no bearing on why he crashed. Nor on why the others before him crashed. We have a pretty strict routine here for picking pilots, and they all measure up to the exacting requirements——" The director paused, then finished, acidly: "Nor would it explain why our pilots are losing efficiency even before they finish their tests."

"Yes," Webley didn't react to the tone, took up the proffered change in conversation. "I heard about the pilots going mad. What's the full story?"

"For psychological details you'd better talk to Brendan, he's the station psychiatrist."

"I'm a bit too long in the tooth to be caught out over psychiatrists," Webley said. "I'll talk to some of the men being processed first. After all, you've had I don't know how many experts here to find out the reason for these crashes. If we're to put a manned space station into orbit within the next two years then something pretty drastic has got to be done—something that all these previous experts evidently failed to do."

"Every single facet of the whole procedure has been checked and double checked." Branigan walked restlessly across to the wide polarised windows and stood watching the desultory activity of mid-day in the desert. "I'm personally prepared to stake my reputation that there is nothing wrong with any rocket. Nothing, that is, that we can possibly detect——"

"In other words, Branigan," Webley cut in heavily. "You'd like to shuffle responsibility for the crashes onto the psychological branch; but you're leaving an escape hatch open in case something is wrong with the material. I quite understand."

Branigan didn't move, except for his hands. They twisted into a knot behind his back. "Do you?" he said bitterly. "Here we are, spending billions, trying to put a chunk of man's environment into space, racing all-out to be the first—and every time we've shot a rocket——"

"So you've got your dreams like all of us. How long do you think the government will stand for all this?" Webley was brutal. "Unless the next rocket is a success, I can't see any more money being spent."

"The next rocket is due tomorrow. We've checked everything so much I think the rocket could put itself together. I'd like you to meet the pilot. That is, if you——"

The intercom's buzz saved him, Webley guessed wryly, from being insulted. As Branigan answered briefly, Webley passed him and stood in turn before the window. The director finished talking and straightened up from the desk.

"That was the final check-out reporting in everything normal, Webley. Now—for tomorrow!"

"Do you think it's wise to carry out another shoot so soon after the last failure?"

"That's the psychological branch. You've heard the old story of pilots crashing a crate and being made to walk straight over to a fresh one and take off? Well, it's a sort of corollary of that, carried to extreme."

"Fantastic extremes," Webley said coldly. "I must ask that tomorrow's shoot be postponed. I'd like to check both the pilot and the rocket myself."

Branigan didn't bother to conceal his annoyance. "I'm sorry, Webley. But that's impossible. Now, if you'd like to carry on I'll have you shown your rooms . . ."

There was no use arguing. Webley turned with a purely formal goodbye and left.

In his room he flopped untidily on the bed and lit another cigarette. It was perfectly plain that not only was his journey here made against his own wishes; but the people here wanted no part of him. They all regarded him as though he had walked in with the Plague. He grunted and disconnected his hearing aid, put his feet up and began to read a paper by an Italian on the fatty degeneration of tissue.

The paper, fascinating though it was, could not hold him. He threw it aside and stood up, to pace restlessly. After all, he had been flown halfway round the world—and if he could stop that rocket being fired tomorrow, then he should do so. He realised, with an amused little shock, that he was the "Man from the Ministry" in person.

He put his coat on and went along to the officers' bar. As he went into the long room, with the plain wooden bar and canteen type tables and chairs, he was aware of the quick upsurge of conversation, the heightened babble and rise of background noise, the clatter of glasses. A normal reaction. He toned his hearing aid down and went across to the bar, ordered a small Scotch. Pretty soon Brendan introduced himself. The psychologist was small, alert, with the rounded bullet-head of a fighter. Webley made a mental reservation on the man. All around him he was aware of the flow of resentment, an anger—not hostile, simply smouldering—against his presence. "What," these technicians and pilots

seemed to be asking him. "What do you want? We're trying to beat this bogey on our own—we don't want outsiders."

Webley put a smile on his careworn face and said: "Pleased to meet you, Brendan. Have a drink?"

"Thanks. How'd you get on with the old man?"

"Branigan? Oh, so-so. Tell me, Brendan, is it all that important that the rocket fires tomorrow? Can't they delay it for further checks?"

Brendan laughed unpleasantly. "They've checked the damn thing until they threaten to strip every thread from use. It's been apart and together umpteen times. No, Webley, it's not the ship that's at fault."

"Your department, huh?"

"I'm not happy about it. The tests we have here are the most exhaustive, bar none, in the world. These men who volunteer to take up the rockets are the men who should do so. In every particular they are perfectly fitted." Brendan smiled and took off his glasses to wipe them. "You know, you could call them the men of the future."

"I agree. But they keep smashing up billions of pounds worth of equipment. It's a costly business, being a man of tomorrow." Webley sipped his drink, his face sombre. "Why can't you delay the shot tomorrow?"

"Why should I? As far as the psychological branch is concerned, Harry Simmons is a 100% risk—absolutely safe."

Webley noticed with a faint glow of pleasure that Brendan had used the name of the pilot. That meant something. He said, slowly: "And yet he'll probably crack up tomorrow. Why?"

A new voice cut in over Webley's shoulder. The voice, diamond hard and perfectly modulated, said: "Why should I, indeed? Well, I shan't, take it from me."

Introductions were superfluous. Webley looked with professional interest at the young man. R.A.F. uniform, with medals and wings and the rocket insignia. All that was so much woad, tribal war-paint. The lad's eyes were good, clear and deep-set, wide apart. The head well rounded and set erectly on the neck—broad chest and slender waist. An exceptionally fit specimen. But, although statistics might say he

had a fifty-fifty chance tomorrow, every nerve in Webley's body told him that this brash squadron-leader would crack up, go raving mad—and destroy a rocket and billions of pounds.

And the Ministry wouldn't like that.

The answer, very definitely, lay locked somewhere in that skull, behind the young face that was grinning at him, waiting for some answer to the last remark.

"Of course you'll be okay," Brendan said heartily.

"Of course," Webley echoed. "Tell me, squadron-leader. How old are you?"

"Twenty-three."

"I see."

Squadron Leader Simmons flushed a trifle, the red staining his Australian tan. "I know I'm pretty old to be a rocket pilot; but, well, they wanted someone with a little more maturity—if you could call it that."

"Harry means——" began Brendan.

"I know," Webley interrupted. "I wasn't thinking along those lines. And I could be wrong. But, if there's nothing wrong with either rocket or pilot——" he stopped speaking abruptly and fumbled out a cigarette.

Brendan finished it for him. "Nothing can go wrong."

"I'd still like that shot delayed, though," Webley said through smoke. "Can't you talk to Branigan?"

"Why? As far as we're concerned, everything is all right." And like that they had to leave it.

The following morning, when, after a full night of rest for the pilot and operating technicians and a fuller night of unceasing labour of the readying crew, they all went out to the bunker. Webley peered through the direct vision slit across the desert. The rocket was a spearhead with wicked backward-thrusting prongs of fins. It shone in the early sun.

A bedlam of ordered activity hummed around him. At different times during the pre-flight he saw individual items of equipment checked no less than a dozen times. He understood that these tests went on until the actual moment

of firing. Somewhere a flatly unemotional voice said: "Zero minus thirty."

Metal chimed softly and the soft clickings and whirrings from the computer banks sounded like a field of crickets in the hot summer sun. Sweat trickled on his face. The direct vision slits were closed and the TV circuits came on. Fluorescent tubes glowed palely in the ceiling. Ventilator openings hummed and still the temperature rose. Tension in the room mounted like static overloading a van der Graeff generator. Nerves were like violin strings.

Twenty.

Branigan was sitting like a king surrounded by his court, and off to one side, partially hidden by huge earphones, Brendan sat with worry chewing up his lips. Webley decided to position himself behind Brendan, contrary to the director's instructions. He felt confident that there, if anywhere, he would find some clue to the causes of the crackups.

Ten.

Webley left the purely mechanical side severely alone. He could rely on the technicians to have everything astronautically correct and Woomera fashion. The soft fleshy bodies and sensitive brain pulp of the pilots—those were the danger areas.

Five.

Squadron-Leader Simmons was talking lazily, his voice somehow reassuring to the men in the bunker—which was as topsy-turvy as you could get. Webley sat hunched behind Brendan, watching the flickering needles of meters receiving their telemetered story of conditions in the rocket. And the condition of the pilot, too. Brendan couldn't hear the pilot's voice—his impressions culled from his instruments would be matched in later to a sound recording. Webley, listening to the pilot, could see those lazy words completely belied by pulse rate, perspiration count, tiny little give-away signs.

One.

In one minute Harry Simmons would be climatically thrust upwards, sitting on top of the biggest firework in the world. Or off it. Webley moved himself into a more comfortable

position in the crowded, cramped space behind Brendan. Black, sharp-cornered boxes of equipment thrust into him. He adjusted his hearing aid. For a moment he thought it had been disconnected—so quiet was everything.

Then—"Nine" the calm, flat voice said. They were starting the count down. Webley heard it down to six, and then felt his old heart give a kick. His hands trembled. Quickly, so as not to be observed—as if anyone had eyes to spare for him—he disconnected his aid. In the cotton-wool that enveloped him he took a long, slow breath, trying to regain his self control. His composure had been absolutely shot.

It wasn't as if he'd never heard a count-down in his life before, either; perhaps he'd heard too many. He watched with a heightened interest the frenetic activity of Brendan's dials, for a moment coupled with him in a bowl of silence. And yet there was a difference, Brendan was avidly listening to audio reports, trying to build up a synthesis picture of everything going on. Webley was sitting watching—hearing nothing.

He didn't hear the last count-off; but he felt the rumble of the floor and walls, and the vibration of the air as the rocket ejected its guts at the earth and recoiled out into space. His teeth felt saw-edged, furry, unpleasant. Shakily, he wiped the perspiration from his face and switched his hearing aid on.

The bunker was full of the uproar of men working on a project they felt must fail—and which was miraculously succeeding. Brendan's meters swam before his gaze. Then he heard Harry Simmon's voice—and the bottom fell out of the world.

Listening, he heard what it was like to walk through hell. He strolled through the laval pits, and dallied by icy volcanoes. In the mad jumble of words and phrases spilling from the speakers, he participated in the breakdown of a human mind. The experience shook him to the most profound depths. He felt degraded, only half human—and yet filled with the bestial desire to go on—and up, to smash whatever lay between man and the nothingness beyond his own planet.

He felt physically exhausted. His heart was kicking

again; but he did not disconnect his hearing aid. Neither he—nor anyone else—relaxed until the rocket buried itself in the Australian sands and silence dropped muffledly over the bunker.

"And that," Branigan said, in a voice quarried from a crypt, "was Number Twelve."

As an epitaph, that statement was foolproof.

They held an official inquiry the following day and Webley attended in his capacity as the Man from the Ministry. It was rather like a funeral service, after the corpse had been buried. As everyone had known beforehand, nothing new was revealed. Everything had functioned perfectly. And then Squadron Leader Harry Simmons had gone berserk, been seized with something that simulated an epileptic fit and had done something fatal with the manual controls. Webley asked the obvious question—and received the obvious answer.

"Of course we can send up rockets on fully automatic," Branigan said wearily. He hadn't slept for twenty-two hours. "But we have to go beyond that. Automatic rockets are useless if their passengers go insane—and you have to have someone to construct a space station; our automatic devices can't do that yet."

More talk flowed on. The effects of radiation on human tissue was brought up. Here was Webley's pet field, one of the reasons why he had been flown out here. He had a worried line between his grey eyebrows as he said: "I'd rather like to discuss the effects of the ship on the pilot, if you don't mind. Indoctrination? How is that done?"

Boredly, hating him, they explained. Tests and tests and re-tests. Living in the ship. Making the pilot part of the rocket on the ground. When they blasted off they were a symbiotic organism. The ship and the pilot worked together. There was nothing wrong with the rocket or with the pilot.

"The effects of radiation must afford the answer," Branigan said stubbornly. "That's your department, Webley. We'd rather like your views."

Webley didn't start in about the hamsters, the rhesus

monkeys, the balloonatics. All that was old stuff. He felt convinced that humans, with proper protection, could live in the space environment. He said so. Without heat, but with finality.

He finished: "I'm going over the recordings of all the shots made, right from number one to number twelve. I anticipate it'll take me all night. And don't expect miracles. All of you say that both the ship and the rocket were perfect. Well, something's wrong, and from my knowledge of the radiation protection afforded, I don't believe it was that." He stood up, pinching his temples wearily between fingers and thumb. Suddenly, he thumped a fist on the table. The assembled experts jumped. "By God," Webley said, "we're going to crack this thing, so help me!"

By the time he had listened, in a sort of horrified stupor, through ten recordings, his brain felt like a fried egg in a pan with too little fat. The things he had heard were literally out of this world, and were just as mind-shattering as that concept indicated. But he still remained doggedly convinced that radiation was not to blame and, if he accepted the testimony of the technical and psychological and all the other branches, as he must do, then they were not at fault, either.

He reached up absently and cut in his hearing aid—he habitually disconnected it when concentrating—and immediately turned it off. He waited until he guessed the hellish racket from the jet plane had swooshed past above, then switched the aid on and made his telephone call. The nerve-busting noise from jet engines and steam engines, and all the other big-noise producing machines that formed part of daily life had always upset him. He felt physically distressed, felt a definite pain, if noise level rose above his normal tolerance level. He'd never checked it; but he vaguely knew that it wasn't the number of decibels, rather, the length of exposure. His mouth quirked down. If only the problem of these pilots cracking-up could be tracked down to a simple phobia like that—the phone rang and he took his call.

"Branigan? Listen, I'd rather like to look over the mock-ups of the rockets—yes—right away—you can? Good."

He picked up his coat, then realised that hardly anyone wore a coat around the desert, and went out and along to the pre-flight labs in his shirt sleeves. His eternal cigarette smouldered between his fingers. He was feeling his years—pretty soon and he'd show up as a statistic in that doctor's lung-cancer graph. Negative, he hoped.

"Dr. Webley—I've been asked to show you around."

"Carry on," he told the fresh-faced scientist who met him. "I'll just browse."

He went through the pre-flight technique with a fine-tooth comb. He clambered in and out of centrifuges, pressure chambers and spacesuit rigs. He crawled up into the rapier nose of the rocket mock-up and lay there, trying to put himself in the place of the pilots who had taken off in the real thing and attempting to feel the feelings they must have had. Eventually, he came down, feeling depression and weariness dragging at him. Outside the laboratory he lit a cigarette.

"Well, when the pilots took off after going through that, they must have felt really at home," he said to the laboratory youngster. He didn't wait for a reply. He wandered off, trying to get a line on the problem. He, like many others on the project, spent a lot of time and energy and sleepless nights trying to do just that—get a line on it. Webley recognised that things don't happen without cause. He began to hate the central Australian desert irrationally because it was keeping him away from his work in London, and he felt a blind, unreasoning dread and revulsion of the new rocket they had nearly finished.

When Brendan, his round head swathed in an Aussie cattle-station hat, joined him with the latest news of R-13, Webley said: "You people are sure-hard fire-eaters, aren't you? I'm not at all sure the Ministry will be happy about R-13. Can you see them rushing to spend more money after all that has happened, Brendan? Because I can't. Not until we find out what is causing the trouble."

"You'll never find out by grubbing about on the ground," Brendan said stubbornly. "You've got to keep on shooting them off. It's the only way."

"That's just fine," Webley said. "Just fine."

Instead of the restrainer on the flight of R-13 that he expected would come from London, he received a tart note advising him that the Ministry awaited with confidence the trial of R-13 'in view of the work you are now doing.' Someone had got to them behind his back. He started off for Branigan's plush director's office in a rage. Half way there he thought better of it, cooled down and went along to the bar for a drink.

Drinking in thirsty gulps, the glass rattled against his teeth. He must have struck some odd little frequency or resonance; he experienced a quite distinct and unpleasant thrill shoot through his nerves. He barely missed spilling the rest of the drink down himself from the stabbing shock of it. It reminded him of sitting in the bunker, feeling the vibration of R-12 taking off, chattering through the walls and floor into his teeth. And then he rushed to the laboratory and shouted for Brendan and the psychological staff.

"This may be utter nonsense," he said to the hastily-assembled psycho-men. "But we have to try every single angle. I know the work you've carried out on noise; but I'm thinking of those epileptic rats that hit the headlines way back in the second world war. Would you run over procedure?"

"We took the line that any human subjected to the unlimited noise of a rocket take-off would break down." Brendan smiled briefly. "We knew about the epileptic rats; but we turned down the psychic vaccination theory in favour of simple baffles. The pilot wears a helmet that is sound-proofed, and his only outside contact is through his ear-phones—actually, they are bone-conduction and his ear-drums are completely cut-off from the atmosphere."

"Ultra sonics?"

"We produced ultrasonics in the laboratory and developed baffling materials. No sound—squeak, grunt or just plain snore could penetrate those helmets."

"You tested the whole rig here, on the ground?"

"Yes. And we sent up rhesus monkeys—but you know all that."

"Precisely, Brendan. I know it all—from the angle of a radiobiologist. That gives me a strength and a weakness in respect to you. First—I'm not tied down by a mass of doctrine like you, and am prepared to have a look at every piece of evidence. But—I'm abysmally weak on what you've actually done. I could beat my brains out on a problem that you'd solved ten years ago. I tried that spacesuit rig. Everything worked fine. But I wonder how it would work—up there?"

"There's only one way to find out—shoot it up."

"And that's the answer. It's like a parachute. You don't know if it'll open until it does. If it doesn't—well, you don't walk back to bawl-out the packer. Hell, Brendan—I've got an idea on all this; but I need help."

And there it hung, quivering on the air. He sensed the dislike, the coldness, flowing from these people. They didn't want him snooping around their projects. Now he had come up with some elementary thinking, on a subject they had covered inside and out. And now he was asking for help. Webley felt a crooked little smile struggling to form on his lips. To hell with them—he could always go back to that work on radiobiological damage that——

"What, exactly, would you like us to do?" Brendan said.

Webley told them. Before he had finished they were running about as excitedly as the monkeys in their cages. What he was proposing was nothing new. It was a little dismaying to a normal physicist who thinks in terms of pounds sterling; and doubly so to Webley, who habitually forgot that money existed except as an abstraction in the megamillions that the Ministry were extremely reluctant to part with. And this stunt would cost considerably more than the Ministry cared even to think about. And—it might not even work.

Webley thrust that thought from him firmly and went to see the pilot of R-13. That young gentleman was spread-eagled on the floor, a .22 Morris Tube at his shoulder, accurately and methodically putting the little slugs through the anatomy of certain very well-known young ladies' photographs. Film stars, by trade, are highly photogenic.

The pilot was a fine shot. He produced some interesting results.

Webley coughed, and said: "Squadron-Leader Parks?"

The young man turned over lazily and stood up, grinning good-humouredly. Apart from a tendency to lankiness, and a gangliness uncommon among rocket pilots, he was out of the same mould as the late Harry Simmons. He quirked an eyebrow.

"I want to ask you some questions," Webley began.

"Oh, don't bother about me, sir. I'll be okay." His smile looked quite genuine, too. For a brief moment Webley wondered how the psychology boys kept up their output of rocket fodder. They went along to the testing laboratory and Parks seated himself in a comfortable chair. Webley propped himself against a hard-cornered bench and waited whilst Brendan and his staff started up their machinery.

Parks' comfortable chair transformed itself devilishly into a bucking pit of hell. The startled pilot jerked once, convulsively, and then he was riding the chair with all the ease and confidence of a bed-salesman on a foam-mattress divan.

"I say, old sport," Parks said. "I've done all this sort of thing ages ago, you know."

Webley didn't answer, flicked his fingers. Brendan nodded. A tech cut in a fresh motor. The chair began to vibrate. The dural members shimmered and Parks' lean face quivered. His hair rose from his head—quite visibly—and transformed itself into a continuously moving mass. His hands, gripping the chair arms, went white and the knuckles clumped as big as walnuts.

His young, good-looking face suddenly took on the appearance of a four-thousand-year-old mummy, freshly unwrapped in some fusty museum. The sound of the chair's vibrations was a physical and visible lance of fire boring mercilessly into Webley's mind. He clenched his teeth. Then he signalled to Brendan. The tech cut the power.

For a moment, no one spoke. The entire episode had occupied just twenty-five seconds. The fragile, breath-indrawn silence lasted until—"I say, sir. That was a trifle rugged on you, wasn't it?"

Webley didn't know whether he wanted to hit Parks over the head or rush out blindly into the desert. Here, he'd set up this torture-chair for the pilot—and in the result he had been the one to suffer. And the pilot was commiserating with him! Ironical, and more—the first failure of his idea.

"Yes, Parks," he managed. "It was a trifle—rugged. As you say." He smiled a little, then, and finished: "Just wait till tomorrow, though. We'll have something else to throw at you then."

"Good show," said Squadron-Leader Parks.

On the following day, they did have something else to throw. This was the big one—and this was the one that would cost. In addition, if it worked—the pilot would end up insane, anyway. "You don't test a gun's killing power by pointing it at your own head," said Webley. "But this time the first test means the diamond test. If it's diamond—it burns. But, if it is diamond—you don't have it any more."

"And I am real rough diamond, sir." Parks grinned lazily. "But I don't intend to get burnt up."

"You know something, squadron-leader?" Webley said. "I think you're right."

By a process of working that combined three hours' labour into one, the technicians had rigged one of the smaller liquid-fuel sounding rockets with a mass of telemetering equipment that would have driven a spider crazy. When Parks hopped off the jeep that had brought him and Webley across the concrete, he looked up comically, and said: "What's this—R-13's poor relation?"

"Oh, you're not going up in this," Brendan said, arriving, panting, with his crew. "We just want you to listen in on the telemetering as she goes up."

Parks looked blank. Webley said, briskly: "Let's all get across to the bunker. We can talk there."

Inside the concrete box, they laid Parks on a table, connected him up to the incoming leads from the recording apparatus. The R.A.F. man looked on tolerantly, but very puzzledly, as they thrust the platinum and silver electrodes

into his skin, over the brain and along the spinal column. He'd done all this stuff many times. When they pressed his body into a moulded plastic form and asked him politely if every part of his anatomy was warm, he was frankly surprised.

"What gives now?" he asked.

"You will be receiving the sensations of a person sitting in that rocket, Parks," Brendan said. "It's too small to take up a real person, plus equipment, so we've got a rhesus monkey in there, with the other end of those leads you're wearing connected up to him."

"I always knew someone would make a monkey out of me one day," sighed Parks.

"We'll be watching you. All you've got to do is relax." Webley tried to keep the vertical line between his eyebrows from filling his vision with dew-drops. It was a tough job.

The test rocket took off. Watching it, it was like living life backwards, back to the time when Harry Simmons had nose-dived into the dirt. Then they were staring at Parks, at the awesome way his handsome young face changed. It took on the mummified aspect, went through that. The eyeballs rolled upwards, leaving a vivid streak of white showing beneath. Then when the young mouth drooled, the head lolled against the straps and needles, the eyes glazed and the palsied body twitched and jerked, they cut Parks off from the impulses from the rhesus monkey in the rocket. The recording went on for an appreciable time after that, then it finished.

Webley was glad that the little monkey came out of the parachuted nose section alive. The little fellow was quite happy, too.

Webley wondered what the Ministry would say about that rocket if this failed. Every time a man bought a packet of cigarettes back in Britain, two thirds of what it cost went towards paying for an egg-cupful of the liquids that had been so lavishly burnt in throwing a funny-looking monkey into the sky. Looked at like that, the whole project tended to get a little out of focus. Then he went to have a drink and talk seriously to Squadron-Leader Parks.

"So," he finished up. "You'll go through a fairly tough time the next week. But I know it will be worth it."

"So do I, sir," Parks said from the hospital bed.

They started on Parks even before he came out of hospital. Branigan looked in, glanced around, half annoyed, half puzzled. Brendan, very respectfully, suggested that the director would prefer the whole picture when they were ready for firing. Webley grinned, suddenly, for the first time for a long while—Brendan, at least, had accepted him.

Then he had no time for personal feelings. They set up a schedule. First, they subjected Parks to the chair ordeal. He came out of that smiling. Then, immediately, they ran him through the recordings made from the test rocket and its rhesus monkey occupant. At first, it was tough.

Very tough.

Webley had little comfort from his knowledge that he had uncovered the cause of the crashes. Twelve ships and twelve men had died unnecessarily. The psychologists had cut out noise very successfully and they'd thought of ultrasonics, too. Subsonics, naturally, had been taken care of.

But there is a vast difference between a ship's mock-up on the laboratory floor, even with all the whirling, spinning, sucking, ingenious devices incorporated, and the rocket itself, bashing unceremoniously past the air and past gravity, and past the powers of endurance of a man. Vibration had played a large part. Enough to put your teeth on edge—a rocket with its venturis flaring, its pumps whining, the whole structure oscillating maddeningly. And the strikingly false idea a man would hold that in space there would be no sound—sure, no sound outside. But inside the hollow reverberator of the rocket there would be enough energy battering at his nerves as vibration to drive him insane. Enough, and to spare.

And so, of course, they had gone insane.

As Squadron-Leader Parks nearly went after every bout with the recordings. Webley watched with eyes that were gravel-lined, blood-coated and ready to fall out. Parks responded magnificently. First, the chair, then, at once, the

recordings. Chair, recordings. Chair, record—— It went on and on.

And—very gradually; but definitely—Parks took the chair and the recordings of the rocket in his stride. He rode the chair with a half-grin on his face, then went straight to the plastic mould and took all that the recordings could give him of what happened to a Primate in space.

"Today," Webley said at last, finally. "By God, Brendan, today it is."

He lit a cigarette and couldn't see whether his hands trembled or not. Parks and Brendan were looking at him. "Well?" he growled.

"We'll do it all right," Brendan said.

"Sure we will, sir," Parks said. "I feel fine. Why don't you get some rest, relax for the shot, sir?"

"I can last out——" began Webley.

Brendan cut him short. "I'll call you an hour before the shot, Webley," he said. He took the older man by the arm and, very firmly, led him towards his room. "We'll have you cracking up next, old man, and that wouldn't do at all."

"You're right," mumbled Webley, falling onto the bed. "What would the Ministry say?"

He thought he heard a rude remark about the Ministry. He couldn't be sure, though—he was riding a chair shaped like a cloud and an incredible feeling of well-being was creeping over him.

By the time he arrived at the bunker he was feeling better than he had done since arriving in Australia. The desert was quite a pleasant place, once you adjusted. He twitched his big hat over his face and ducked into the control room.

The set-up was as before, with one difference.

Squadron-Leader Parks was sitting in the chair—The Chair, they were calling it now—positioned importantly before the main door. Outside the door a jeep waited with motor running and a mad-dare-devil at the wheel.

"All ready, Webley," Branigan said, pleasantly. "You're just in time for the show."

From the director, that was a bunch of flowers.

They started Parks up in his chair and he rode it with that lazy grin. Then he was rushed into the jeep, hurled into the R-13, which, mechanically, was literally panting to go. Everyone scampered clear and the count off, miraculously, was at "Three—Two—One—Zero!"

Webley kept his hearing-aid on all through it.

He knew the shot would be successful. But, all the same, it was wonderful to hear Parks saying: "One hundred and fifty, everything okay." And, a little later: "In orbit, all correct and Woomera fashion. Yippee—we've done it!"

"Congratulations, Webley," said the director, and held out his hand.

"Don't thank me." Webley grinned tiredly. "Psychic vaccination, transferred from the noise-affected epileptic rats, to the nervous tensions of the human animal. Vibrations were the root cause—they struck through all our precautions and dumped a man's brains into his guts, metaphorically speaking. All I did was to think the problem through—it had to be some interaction of the known variables—the technical and psychological branches swore blind each was perfect. I felt that radiation and other space hazards were not to blame. So—a combination. It was the ship working on the pilot."

Brendan chuckled here. "The Ministry have just cabled a demand for an explanation of your silence, Webley."

"And so there was only one thing to do," Webley went on, ignoring the last remark. "Psychic vaccination. You precede the unpleasant sound, or vibrational and emotional stimulus, with a noise that the subject can tolerate. A period, a length of time on that, and they are able to tolerate the second noise, too. The effect wears off in about a week, they say, so we'll have to have Parks down by then."

"Psychic vaccination," said Brannigan. "That's a new one for the training manuals."

"The Ministry, Webley——" Brendan started to say.

Webley raised a finger and pointed up.

"Up there, orbiting the Earth. That's the answer, tell the Ministry. Lucky thirteen, fully vaccinated."

A SCHOOLROOM FOR THE TEACHER

by PHILIP E. HIGH

EXPLORING THE GALAXY COULD BE A LITTLE LIKE
ROBBING A BEEHIVE. YOU COULD GET THE HONEY—
OR YOU COULD GET STUNG

THE SHIP LAY LIKE A DULL BRONZE ARROWHEAD ON AN outcropping of black rock. Above, a blue-white sun, with a visible corona, shone steadily from a cloudless sky. The nose of the vessel pointed across the rock towards the fringe of a mist-shrouded jungle. Two miles to the rear rose gigantic black cliffs which made the three-hundred-foot vessel appear toy-like and out of perspective.

The ship had remained in the same position for six terran weeks, but the exit ports had remained closed. Survey teams get around a lot, and experience had taught them that the safest preliminaries are conducted from inside. The planet looked good and everything added up: met. check, bug count, atmosphere analysis. Plasti had even gone so far as to rub his fat hands together and say: "Perfect, typical primitive planet, stage nine."

Merrick, who had been taking radar-geological readings, said: "Nuts, Plasti, older than Terra."

Plasti beamed. "Always the spanner in the works, Merrick. So its got an old body, who cares? On top, primitive, stage nine."

Linge, the anthropologist, turned from the scanner, frowning. "Candidly, I wish I could classify a stage. Stage nine indicates gigantua, nature striving to assume a dominant life form through size and strength. Dinosaurs, for example, are

typical stage-nine development. Will you take a look at this for example." He snapped a switch and they crowded round the screen.

They saw a growth that bore a vague resemblance to a privet. A number of green bugs with four spidery legs were busy among the frail white blossoms.

"They're pollinating," explained Linge. "Now watch." He made slight adjustments to the scanner controls.

At the foot of the plant a procession of the green bugs entered a hole near the roots and emerged by another bearing small stick-like objects on their backs.

"So?" said Plasti.

"So I took it closer. The little sticks come out of the roots as liquid which hardens on contact with the atmosphere . . ."

"I get it," cut in Merrick, strangely out of character in his excitement. "You get upstairs and do some fertilizing and I'll see the boys get a handout in the basement."

"What's new about symbiosis?" said Plasti.

"Nothing, it just happens to be rather advanced for stage nine. Take a look at this, too, for God's sake."

The screen showed a thick growth about eight feet in height. It was a yellowish green, and quite featureless.

"So you've got yourself an outsize cabbage stalk," said Plasti. "We've seen funny things before, funnier, come to think of it. Take that net growth on Riegel for instance——"

"The net growth was there all the time," cut in Linge, scowling. "These things were not. I noticed the first one yesterday, now look——" He swung the scanner quickly.

They counted eighteen of the growths in a half circle facing the ship. They were linked by thick greenish roots which crossed and recrossed to the very edge of the rock formation.

Plasti was unabashed. "So there's semi-intelligent plant life. We met one on Arctua."

"Arctua was stage ten," said Merrick, sharply. "Geological data matched the evolutionary stage which was a struggle between semi-intelligent plant life versus animal ditto."

Linge snapped off the scanner. "What is the geological stage, Merrick?"

"Twenty eight, maybe thirty, solar readings confirm."

Linge snapped his long thin fingers irritably. "I tell you, Plasti, it doesn't check. If this planet is stage twenty eight, where is the dominant life form? To suppose there isn't one is an absurdity. Its tantamount to assuming a stasis in normal evolution, which is impossible."

Plasti grinned broadly, his face untroubled. "You boys, you worry too much. We've been doing this for years, yet always you get the data-shakes, but we'll make out. Planets with mobile fungi, intelligent jungles, lethal spores, hell, we licked 'em, didn't we? Guess I'll go outside and take a look; huh?"

"Not on your big feet, you don't," said Merrick. "You use the psychobot."

"I wasn't going without it," said Plasti. "I'm not that crazy."

Plasti was not a scientist, although he sometimes spoke as if he was; odd scientific phrases here and there he had picked up from the team. Often he was in the way, more often infuriating with bland advice, but they needed him, all of them. He was the best psychorobot operator in the whole of combined survey.

Plasti lowered his bulk into the operating chair, fitted the circular helmet on his head and inserted the audios carefully in his ears. There was a small metal plate at the base of his skull which had been placed there by the surgeons in his early training. In the plate was a socket designed to take a plug from the control chair.

Linge said: "All set, Plasti?"

"Am set."

Linge pulled the master switch.

Plasti felt the familiar jerk and sense of disorientation. He wanted to retch, he always did. It was as if he had been double-somersaulted into free fall. The four seconds required for re-orientation seemed centuries. Slowly, feeling and senses returned. Dimly he made out the lever of the exit lock in front of him.

Plasti was middle aged, with the beginnings of a paunch

and inclinations to physical laziness. But not in the new body with its intricately geared joints, armoured durasteel tendons and unbelievable acute senses.

Men no longer attempted to build robots, they had stumbled across something better—psychorobotics. They had won two interstellar wars with them, and they were now used almost exclusively on dangerous survey missions.

It looked like a robot which stepped out of the exit port. It had a body, a head, two legs and two arms terminating in humanoid hands. It was built of durasteel alloy and weighed two tons, but it was Plasti who stepped onto the hard rock and stared about him. Plasti's ear which detected the hum of insects. Plasti who felt the heat of the blue-white sun on his face and stared at the semi-circle of squat growths facing the ship.

Plasti knew from reason he was in the control chair directing the robot's movements through the psychorobotic hook-up, but once in control he could never convince himself it was so. He could not *feel* his body in the chair. He knew, but could not believe, that the sights which came to his eyes were received by the radar probes of his vehicle and re-translated by the converter into comprehensible pictures. "Excellent rapport," his instructors had termed the illusion.

It had not been so pleasant in the early days, during the Sol-Liegia war, when his "body" had been a missile with a hydro-nuclear warhead. It had been rather like going head first down an elevator shaft, knowing your head was going to blow up when you hit bottom.

He strode across the rock and reached the first featureless vegetable—nothing happened. Carefully, he stepped over the wrist-thick mass of roots, passed through the semi-circle and beyond.

"Nothing to it, boys," said the inert figure in the control chair.

Linge, at the scanner, said: "Watch it, Plasti, there are some things about two hundred feet above you. They look like footballs with circular transparent wings. They could be the equivalent of birds, on the other hand——"

"Yeah, I know, aircraft. You boys give me the heebies.

What sign of civilization did we see on the air prelim?" There was a pause. "I can hear those things now, sound like a tenor sax."

Linge was sweating visibly. "I don't like it. There's something damn funny about a planet that reaches stage twenty-eight without a dominant life form."

Plasti's voice cut in again five minutes later. "I'm well into the so-called jungle now. Everything is neatly arranged and laid out like an autofac." The voice held a note of uncertainty.

"Maybe you boys do add up, this is a damn funny layout. I've just passed a row of squat green plants linked at the top with a vine like a row of generators. It sounds nuts, sure, but thats the way it looks. We got electric eels back home, so, crazy to think of electric plants?"

The voice stopped for some minutes, then continued. "I am about a mile away from you and if I were on my own I'd be sweating. I thought I had it all neatly tied up with the dominant life form vegetable. Now I'm not sure. I thought I saw a snake in the distance, one hell of a snake, about eighty feet in length. It wasn't a snake, it was insects, big insects, like purple bumble bees. They were flying about a foot off the ground and winding in and out of the so-called trees. 'So whats funny about bees swarming?' I said to myself, until I looked closer—they were flying in echelon, and all neatly stepped and grouped for size. Later, I saw a thing like a horse, only it was orange-coloured. It goes up to a tree and a thick vine comes out of the trunk and the horse tanks up. Yeah, it puts its mouth to the end of the vine and takes a load, like it was fuelling up. This planet doesn't make sense any more—say——" The voice paused. "I've just come on the craziest tree. Wait, I'll beam it back for you, channel four."

The screen showed a branchless growth about forty feet high. On the top was a single basket-shaped orange blossom which seemed to be pivoted and rolled continuously from side to side.

Merrick pushed Linge suddenly to one side and shouted at Plasti's body. "Plasti, turn around and come back. Don't do anything hostile, try not to tread on anything, just pile the

power into that thing and get here fast. If they try and stop you, dump the robot, break contact——” He stopped. There were beads of sweat on his face.

Linge looked at him puzzledly. “What the hell?”

“Part hunch, part reason. That tree is too damn like the sub-space radar device we’re experimenting with back home. If they’ve got that, they must have spotted us long before we came out of hyper-drive.”

Linge’s face took on the beginnings of an acid smile then straightened suddenly. He leapt to the scanner screen. “Squat growths, interlocking roots, or should it be cables? Could be a neat little electrical set-up that could fry us off the planet. Why didn’t we see it sooner? Hurry, Plasti, Hurry!”

Merrick had gone to activate the pilot and astrogator. He pulled the switch operating the freeze-stasis and ran to the next compartment.

The freeze-stasis would take half an hour to bring the pilot back to normal consciousness, but Plasti would be back by then and they could crash-blast to get away—if they were allowed to.

He activated the fighting squad for safety and ran back to the control room. Ten weapon techs. and a lieutenant was not a big force, but it could be useful. Further, they were the only ones who fully understood the ship’s defences.

The freeze-stasis was not necessary for interstellar flight in the time sphere, but it was vital to supply. Men in freeze-stasis did not eat, did not consume oxygen and could be neatly stowed in the coffin-like receptacles until required. It was an accepted part of space flight and had solved more psychological problems than the early pioneers would have cared to think about.

When Merrick got back to the control room, Plasti was already in sight, the huge metal body pounding towards the ship. When he was about eighty yards from the rock, the thick green roots quivered and something crept upwards from the growths. A shimmering something, faintly blue, dancing like a heat haze on a summer day.

“Force screen,” said Linge in a harsh voice. “Don’t run into it, Plasti, break contact and come out.”

The inert figure in the control chair twitched slightly. "Sorry, boys, can't do. I can stop running, go back, stand still, but I can't come out."

"Break contact, you fool!" Linge's voice was a scream.

"I can't." The voice was thick. "Something's got me tied up in here, its like I was sealed in——" The voice faded.

Linge was staring into the screen. Flying things were descending in slow spirals and circling the robot.

Merrick kept glancing nervously over his shoulder. "What's keeping that damned pilot?"

"They're letting him go—I think." Linge's voice was cracked with strain. "Yes, they're lowering the force screen—yes, yes, by God, he's through."

The figure in the control chair stirred slightly and sighed.

"You all right, Plasti?"

"Am fine." The voice sounded far away.

They heard the clang of metal and the whir of the self-sealing lock as the robot entered the cubicle.

Plasti twisted in his chair, retched a little, there was sweat on his face, but he grinned. "Guess I fooled them," he said hoarsely. "I said we were peaceful and wanted to leave. They seemed to understand, they're sort of telepathic."

The pilot came in, stretching and rubbing his eyes. "What gives?"

Merrick screamed: "Get in that control chair and get us out of here."

The pilot's blue eyes were suddenly alert. "That bad!" He leapt for the control chair and flipped switches. "Personnel, emergency! Repeat, emergency. Stand by for crash-blast."

Linge frowned over the astro-chart. He was still muzzy from the freeze-stasis, but his hand was steady. Very carefully, he drew a red line round a star system and printed the word "BANNED" within it.

Markham, the psych, came in, rubbing his eyes. He glanced over Linge's shoulder at the astro-chart. "I second that, those things are smart. They left very little I could trace, and I think what they left they meant me to find."

"Plasti's all right?" Merrick looked up, worriedly.

"Nothing wrong with him. He'll be out in a minute, just a question of letting the narcozine wear off. While you boys have been dreaming in the freeze coffins, I've had to work." He shook his head worriedly. "Not that it did much good, even with a risky third-stage trance."

"What did you get?" asked Merrick.

"Primary reactions only. Amazement, disbelief and revulsion, in that order. The idea of a dominant life form is, to them, an affront to rightful order, almost obscene. According to their ideas, true progress should tend towards complete symbiosis, that being the purpose and order of things."

"When we say 'they,' we mean 'it,' don't we?" said Merrick.

Markham nodded. "Every possible life form working together as a unit, yes, but its difficult to grasp."

"Maybe we'll reach that stage one day," said Linge.

Markham frowned. "If they have their way we'll have it a damn sight sooner than we want it. They regard us as an unpleasant and particularly virulent form of galactic cancer."

"They couldn't get a lot from Plasti's mind, could they?" Merrick sounded as if he were clutching at straws. "I mean, he's not a scientist or an astrogator, nothing to help them——?"

"Nothing is lost," said Markham. "Consciously forgotten, yes, but not lost. If men could lose their memories and experiences, you wouldn't need me. They could have taken the hell of a lot out of Plasti's mind, apart from conscious memory." He paused. "You're not going to like this, I don't like it, either. They left a distinct message in Plasti's mind. *You are in need of a cure for your sickness and long overdue for an educational unit.*"

"If they pay the Federation a visit they've got themselves a swell schoolroom," said Merrick.

"The robot!" said Linge suddenly. "Do you suppose they could have put spores in it or something?"

Merrick shook his head. "Even if they did, the cubicle is exit only, no way into the ship. In the cubicle it gets the treatment, insecticides, gamma rays and, to make sure, the

cubicle is partly opened in deep space. No, I think we're safe enough there. I'm afraid they may have put some sort of trace on us."

"I hate to think," said Linge, "what they thought of Federation history. The number of worlds we have—er—acquired, during our expansion, the exploitation, the number of life forms pushed into reservations—God!"

"A swell schoolroom," said Merrick softly. "A swell schoolroom."

Plasti came in, looking sleepy but untroubled. "Hello, boys." He glanced at the astro-chart. "The Federation will never take our word to ban a habitable planet. The next survey ship will have a couple of cruisers with it for company."

Linge said: "Then they're crazier than I thought they were. You can fight a race, or an empire, but not a planet. They'd have to fight a world, every mouse, and tree, every animal and bug, virus and bird fighting against them. It can't be done. I think, too, its technically far in advance of us, that force screen, unified, no stress fluctuations, no warps——"

"Complete symbiosis," said Markham. "Something entirely outside our experience, something we don't know how to begin to fight."

"How do we know its confined to one planet only?" said Linge.

There was sweat on Merrick's face. "Even if we can convince the Survey committee, which I doubt, there'll be one answer. They'll send out a fast cruiser and drop a planet-wrecker. If necessary, they'll crisp the whole system to so many cinders." He sat down, wearily. "Where is it going to end, Linge? Sometimes I think we keep pushing outwards because we're scared. Because we know that sooner or later we'll meet something too big for us. We have to go out to the stars and meet it because we're afraid it might creep in and meet us. Its psychological, I suppose, like the feeling that someone is walking behind you all the time."

Linge said, helplessly: "We're only tools, it's not in our hands."

"Passing the buck." said Merrick. "We both know it but

can't do a thing about it." He shrugged slightly. "I suppose we should be grateful we got out of there in one piece."

"Grateful, too, that you're home," said Markham, gently. "I don't know if you realise it, but we're in orbit."

"Home," said Plasti softly. "It's been a long, long haul."

Merrick sat at the scanner as ground control brought them gently down on the polarising beams. It was good to see Earth again, with its great seas, its huge sprawling cities and the green of grass and forest. Far better than worlds that didn't look right and never could resemble Earth. Worlds which harboured things which made you scream nights and wake up in a dank sweat.

He was so lost in his thoughts that he never felt the ship drop into the landing cradle, or heard the brisk commands issue from the speaker.

Linge clapped him suddenly on the shoulder. "Wake up, man, we're home." He glanced at the scanner and grinned. "One day some jacked-up little field officer is going to slap a charge on Plasti that will stop him a year's pay. It isn't that he hasn't been warned. He just can't help showing off. He'll do his Tarzan act, I suppose, stamp around the field beating his chest."

"What do you mean?" Merrick was still vague.

"That." Linge pointed to the screen.

The robot was stepping from its cubicle and onto the landing field.

Merrick half rose, his eyes protruding. "He isn't here, he isn't—oh, my God! My God!"

"What the hell do you mean?" Linge spun round. The control chair was empty.

"We thought of bugs and spores; we never thought that something else could control that thing."

They watched the robot stride away from the ship and across the landing field.

"Due for an educational unit, aren't we?" said Merrick in a thin voice. "There goes the teacher . . ."

Radio Astronomy

by

WALTER G. SPEIRS

AN INTERESTING ARTICLE ON THE NEW METHOD
USED TO INVESTIGATE THE UNIVERSE AROUND US

IF WE COULD SEE BY MEANS OF RADIO WAVES THE UNIVERSE would seem to us to be an alien, ghostly place. The Sun would be a dim spectre in the sky, sprawling three times as large as the visible Sun we know. The heavens would be patterned with new, misty constellations quite different from the familiar zodiac, and where the Milky Way extends would stretch a faintly luminous arc.

There are two windows on the Universe in our invisible shield, the Earth's atmosphere. Through one comes the visible and infra-red light to which we owe our sight and the climate of Earth.

Not so well known, is the other window—the radio window—through which, if we saw by means of radio waves, we would receive that eerie impression of the Universe. This window, this gap in the Earth's defences against radiations, is the region of the lower electromagnetic spectrum not absorbed by air. Through it we are able to bounce short-wave radio waves off the Moon—and will one day be able to communicate with spaceships orbiting between the planets.

At the moment attention is focussed on the strange radio signals that come in from outer space through the window. These radio messages emanate from our Sun, from the hub of our Galaxy and, further still, from galaxies so far distant that even the 200-inch Mount Palomar telescope cannot enable anyone to see them. These signals tell us of vast, turbulent clouds of gas exploding from supernovæ, of

galaxies in collision, and of the cool clouds of hydrogen gas swirling between the stars.

The study of these radio waves is part of the youngest science of all—radio astronomy. Only eight years old, radio astronomy is one of the most flourishing branches of astronomy and already, even before the giant new instruments under construction are brought into operation, is building a clearer picture than ever before of the Universe in which we live.

To further this study, a £650,000 radio set is being built to tune in to space.

This is the 3,000-inch radio telescope under construction at Jodrell Bank, near Manchester. The pet project of Manchester University, 500 tons of concrete and steel have gone into the foundations on which the 1,500-ton superstructure will be mounted. A vast steel bowl will trap the radio waves; moved by powerful electric motors, it will automatically track any part of the sky.

This mammoth, precision instrument is a far cry from the home-made aerial with which, twenty years ago, an American electrical engineer, named Jansky, first discovered radio signals coming in from beyond the Solar System. He realised that the majority of the signals he was receiving came from our Galaxy; but he was unable to pick out a single visible object that coincided with the areas of greatest intensity. The main trouble at this time was that his aerial had too small a resolution, the ability to pinpoint a source with extreme accuracy.

For many years there was no active interest in the signals. Partly, this was due to the war, and, fittingly enough, the next development came because of war-time conditions.

The Allied radar system, during 1942, was sometimes jammed by a strange interference that occurred only during the day. Investigation showed that the jamming was due to outbursts of activity on the Sun. When the operational scientists returned to their peace-time research, one of them remembered the phenomenon and published a paper on it. Gradually, interest grew, with more and better equipment

coming along to extend the range of enquiry, until today a continual radio watch is kept on the Sun by special directional aerials in an effort to understand the cause of these violent outbursts. For the Sun is the only star close enough for us to examine in detail—and it is the only star we *know* to be an emitter of radio waves.

Normally, the Sun is only a weak broadcaster, radiating from the main disc at centimetre wavelengths and from the surrounding corona at shorter wavelengths. Sunspots broadcast more intense signals and, occasionally, when a solar flare flashes on the surface, lasting between a few seconds and twenty minutes, extremely intense radio waves are generated. Analysis of these waves shows that the sources are moving outwards from the Sun's surface at between 100 and 1,000 miles per second. During this period the radio sun becomes a thousand times brighter than before, even although only a thousandth of the surface is affected.

A loudspeaker tuned in to this broadcast reproduces a sound like the rushing of a vast wind.

The cause is an explosion near the surface of the Sun jetting particles into the tenuous corona to interact with the magnetic fields, electrons and ions found there. At the same time, a flash of ultraviolet light travels at the speed of light to cause a fade-out of radio reception on Earth.

By 1948, astronomers were able to increase the resolving power of their radio telescopes by using two aerials several hundred yards apart, the unit acting like the interferometers attached to normal telescopes. With these instruments there began a systematic search of the skies for new radio sources. Although this type of instrument is fixed so that only the rotation of the Earth enables it to sweep the sky, over 200 intense radio sources had been discovered by 1953. In addition, the background of cosmic "noise" along the plane of the Milky Way was accurately plotted.

Because of the small size and great intensity of many of the sources, it was at first believed that they were radio stars in our Galaxy, stars that were dark or only slightly luminous and radiating most of their energy in the radio bands. But no such stars have been discovered.

A new, fixed, 660-inch radio telescope, able to pick out a beam only two degrees wide, was in 1950 brought into operation at Jodrell Bank. With it, astronomers were able to single out radio signals from another galaxy, the spiral nebula N.31 in Andromeda. Analysis of the results showed that the radio emission from this galaxy was of the same type and intensity as from our Galaxy—this was further evidence that radio sources are widely spread phenomena, and our Galaxy is similar to the millions of others scattered throughout space.

Although many of the intense radio sources are distributed in such a way that it is likely that they are extra-galactic, difficulty was experienced in photographing them. However, this difficulty was eventually overcome by using very long exposures with the 200-inch telescope—and faint galaxies were discovered. But analysis of their spectra showed a curious fact. Their light contained extremely rare radiation known as forbidden emission.

One such galaxy is Cygnus I, the second most intense radio source. When photographs of Cygnus I were examined, it was found to be the scene of a collision between galaxies. The resulting chaos emits more energy as radio waves than it does as light.

When the light and radio waves left them 100 million years ago, the two galaxies were tearing through one another at five million miles an hour. This ponderous mutual onslaught might last for as long as two million years, or as astronomically briefly as 100,000 years, depending on whether the two galaxies sweep through edge or face on. The thousands of millions of stars contained in them escape direct collisions; but their interstellar gas, tenuous as it is, cannot escape the fury of molecular impact. Heated to red heat, it emits the forbidden emission lines not normally found in gases and tends to be swept out into inter-galactic space, there to form a new galaxy of its own. Several other radio sources have been identified as galaxies in collision. Recorded and played back, the noise of the collision sounds like static shot through with scratches and hisses.

An interesting piece of deduction and detective work took

place in our own Galaxy. The most intense radio source of all is the one in Cassiopeia. The third strongest source was found in the constellation of Taurus and was eventually pinpointed in the Crab Nebula of our Galaxy—remember, the second was extra-galactic. Now, the-Taurus source was known to be the remnant of a supernova that occurred in 1054 and consists of a violently expanding cloud of hot gaseous filaments moving at 200 miles per second and surrounding a bright star. Checking further, astronomers discovered that the remains of the Tycho Brahe supernova of 1572 is also a strong radio wave emitter. Evidently, the exploding gas clouds ripped from the surface of a star are the source of many of the radio waves. But what of Cassiopeia?

A search of the sky in the Cassiopeia region, begun in 1952, eventually resulted in the discovery of a group of filaments of hot gas. These have a velocity of between 600 and 3,000 miles a second, and it is now believed that they, too, are material from a supernova explosion. In this instance their radiation is strengthened as it collides with a dense cloud of interstellar gas and dust—the dust hiding the remains of the novæd star. The strengthening effect is due to electrons in the gas cloud interacting with magnetic fields produced by the clash to create new radio waves.

With the increase in efficiency and resolution of the new radio telescopes, more attention has been focussed on the theory behind this young science. In several cases, predictions outpaced experimental discovery.

Such was the case of the radio waves from cool clouds of hydrogen gas. Theoretical studies suggested that these clouds should produce radio waves of a wave length of twenty-one centimetres, and in 1951 this was found to be true. The discoverers of this special hydrogen line, at Harvard University, realised the importance of their work. For the first time they had a means not only of charting the hydrogen clouds in our galaxy but also of being able to determine their speed and direction.

Most radio sources broadcast over a wide range of wavelengths, but with this work as a beginning, having a single twenty-one centimetre wave to work with, astronomers can

now measure its Doppler effect, the increase in wave length as the source is moved away from us. This gives a good indication of direction and speed, and the distance of intense radio sources may be measured by comparing the absorption of their radio waves at twenty-one centimetres with the intensity of the hydrogen line radiation close to the source.

Up until the end of the last war, our knowledge of the Universe has come from the visible end of the spectrum and a narrow band on either side, due to the limiting capacity of the human eye, photographic plates and the blocking effect of the Earth's atmosphere. This type of astronomy necessitated exceptionally clear weather conditions, with no hint of fog or mist, reason for the massing of the large reflectors in the American Southwest and in South Africa. However, where there are conditions which cut down the amount of light entering the telescope, as well as exaggerating atmospheric tremble, the normal type of telescope is virtually useless. Here in Great Britain we are coming to rely more and more on the radio telescope as an eye into space, for it does not matter to radio waves if the air is full of a London pea-souper.

And the radio telescopes are revealing much about our environment in space.

Radio astronomy gives us a clear picture of our position in our Galaxy. The nucleus of the Galaxy is 20,000 light years across and is filled with turbulent hydrogen gas. There are two spiral arms situated at 15,000 and 21,000 light years out from the centre, whilst the spiral arm in which is situated our Sun comes next at 27,000 light years out. Only two further spiral arms, at 35,000 and 40,000 light years from the nucleus, separate us from intergalactic space.

And, from far beyond the present vision of the world's largest reflectors, the radio telescopes are still bringing in fresh information to add to the store of knowledge we have of the Universe.

THE MAN WITH ENGLISH

by H. L. GOLD

*ENGLISH? WELL, CALL IT BACKSPIN, OR SCREW, OR
GOOGLY, OR REVERSE TORQUE. BUT DON'T WORRY ABOUT
IT UNTIL YOU GET IT. THEN YOU'LL KNOW*

LIVING IN HOSPITAL, EDGAR STONE ADDED UP HIS MISFORTUNES as another might count blessings. There were enough to infuriate the most temperate man, which Stone notoriously was not. He smashed his fist down, accidentally hitting the metal side of the bed, and was astonished by the pleasant feeling. It enraged him even more. The really maddening thing was how simply he had goaded himself into the hospital.

He'd locked up his drygoods store and driven home for lunch. Nothing unusual about that; he did it every day. With his miserable digestion, he couldn't stand the restaurant food in town. He pulled into the driveway, rode over a collection of metal shapes his son Arnold had left lying around, and punctured a tyre.

"Rita!" he yelled. "This is going too damned far! Where is that brat?"

"In here," she called truculently from the kitchen.

He kicked open the screen door. His foot went through the mesh.

"A ripped tyre and a torn screen!" he shouted at Arnold, who was sprawled in angular adolescence over a blueprint on the kitchen table. "You'll pay for them, by God! They're coming out of your allowance!"

"I'm sorry, Pop," the boy said.

"Sorry, my left foot," Mrs. Stone shrieked. She whirled on her husband. "You could have watched where you were going. He promised to clean up his things from the driveway right after lunch. And it's about time you stopped kicking open the door every time you're mad."

"Mad? Who wouldn't be mad? Me hoping he'd get out of school and come into the store, and he wants to be an engineer. An engineer—and he can't even make change when he—hah!—helps me out in the store!"

"He'll be whatever he wants to be," she screamed in the conversational tone of the Stone household.

"Please," said Arnold. "I can't concentrate on this plan."

Edgar Stone was never one to restrain an angry impulse. He tore up the blueprint and flung the pieces down on the table.

"Aw, Pop!" Arnold protested.

"Don't say 'Aw, Pop' to me. You're not going to waste a summer vacation on junk like this. You'll eat your lunch and come down to the store. And you'll do it every day for the rest of the summer!"

"Oh, he will, will he?" demanded Mrs. Stone. "He'll catch up on his studies. And as for you, you can go back and eat in a restaurant."

"You know I can't stand that slop!"

"You'll eat it because you're not having lunch here any more. I've got enough to do without making three meals a day."

"But I can't drive back with that tyre——"

He did, though not with the tyre—he took a cab. It cost a dollar plus tip, lunch was a dollar and a half plus tip, bicarb at Rite Drug Store a few doors away, and in a great hurry, came to another fifteen cents—only it didn't work.

And then Miss Ellis came in for some material. Miss Ellis could round out any miserable day. She was fifty, tall, skinny and had thin, disapproving lips. She had a sliver of cloth clipped very meagrely off a hem that she intended to use as a sample.

"The arms of the slipcover on my reading chair wore

through," she informed him. "I bought the material here, if you remember."

Stone didn't have to look at the fragmentary swatch. "That was about seven years ago——"

"Six-and-a-half," she corrected. "I paid enough for it. You'd expect anything that expensive to last."

"The style was discontinued. I have something here that——"

"I do not want to make an entire slipcover, Mr. Stone. All I want is enough to make new panels for the arms. Two yards should do very nicely."

Stone smothered a bilious hiccup. "Two yards, Miss Ellis?"

"At the most."

"I sold the last of that material years ago." He pulled a bolt off a shelf and partly unrolled it for her. "Why not use a different pattern as a kind of contrast?"

"I want this same pattern," she said, her thin lips getting even thinner and more obstinate.

"Then I'll have to order it and hope one of my wholesalers still has some of it in stock."

"Not without looking for it first right here, you won't order it for me. You can't know *all* these materials you have on these shelves."

Stone felt all the familiar symptoms of fury—the sudden pulsing of the temples, the lurch and bump of his heart as adrenalin came surging in like the tide at the Firth of Forth, the quivering of his hands, the angry shout pulsing at his vocal cords from below.

"I'll take a look, Miss Ellis," he said.

She was president of the Ladies' Cultural Society and dominated it so thoroughly that the members would go clear to the next town for their dry goods, rather than deal with him, if he offended this sour stick of stubbornness.

If Stone's life insurance salesman had been there, he would have tried to keep Stone from climbing the ladder that ran around the three walls of the store. He probably wouldn't have been in time. Stone stamped up the ladder to reach the highest shelves, where there were scraps of bolts. One of them might have been the remnant of the material Miss Ellis

had bought six-and-a-half years ago. But Stone never found out.

He snatched one, glaring down meanwhile at the top of Miss Ellis's head, and the ladder skidded out from under him. He felt his skull collide with the counter. He didn't feel it hit the floor.

"God damn it!" Stone yelled. "You could at least turn on the lights."

"There, there, Edgar. Everything's fine, just fine."

It was his wife's voice and the tone was so uncommonly soft and soothing that it scared him into a panic.

"What's wrong with me?" he asked piteously. "Am I blind?"

"How many fingers am I holding up?" a man wanted to know.

Stone was peering into the blackness. All he could see before his eyes was a vague blot against a darker blot.

"None," he bleated. "Who are you?"

"Dr. Rankin. That was a nasty fall you had, Mr. Stone—concussion, of course, and a splinter of bone driven into the brain. I had to operate to remove it."

"Then you cut out a nerve!" Stone said. "You did something to my eyes!"

The doctor's voice sounded puzzled. "There doesn't seem to be anything wrong with them. I'll take a look, though, and see."

"You'll be all right, dear," Mrs. Stone said reassuringly, but she didn't sound as if she believed it.

"Sure you will, Pop," said Arnold.

"Is that young stinker here?" Stone demanded. "He's the cause of all this!"

"Temper, temper," the doctor said. "Accidents happen."

Stone heard him lower the venetian blinds. As if they had been a switch, light sprang up and everything in the hospital became brightly visible.

"Well!" said Stone. "That's more like it. It's night and you're trying to save electricity, hey?"

"It's broad daylight, Edgar, dear," his wife protested. "All Dr. Rankin did was lower the blinds and——"

"Please," the doctor said. "If you don't mind, I'd rather take care of any explanations that have to be made."

He came at Stone with an ophthalmoscope. When he flashed it into Stone's eyes, everything went black and Stone let him know it vociferously.

"Black?" Dr. Rankin repeated blankly. "Are you positive? Not a sudden glare?"

"Black," insisted Stone. "And what's the idea of putting me in a bed filled with breadcrumbs?"

"It was freshly made——"

"Crumbs. You heard me. And the pillow has rocks in it."

"What else is bothering you?" asked the doctor worriedly.

"It's freezing in here." Stone felt the terror rise in him again. "It was summer when I fell off the ladder. Don't tell me I've been unconscious clear through till winter!"

"No, Pop," said Arnold. "That was yesterday——"

"I'll take care of this," Dr. Rankin said firmly. "I'm afraid you and your son will have to leave, Mrs. Stone. I have to do a few tests on your husband."

"Will he be all right?" she appealed.

"Of course, of course," he said inattentively, peering with a frown at the shivering patient. "Shock, you know," he added vaguely.

"Gosh, Pop," said Arnold. "I'm sorry this happened. I got the driveway all cleaned up."

"And we'll take care of the store till you're better," Mrs. Stone promised.

"Don't you dare!" yelled Stone. "You'll put me out of business!"

The doctor hastily shut the door on them and came back to the bed. Stone was clutching the light summer blanket around himself. He felt colder than he'd ever been in his life.

"Can't you get me more blankets?" he begged. "You don't want me to die of pneumonia, do you?"

Dr. Rankin opened the blinds and asked: "What's this like?"

"Night," chattered Stone. "A new idea to save electricity—hooking up the blinds to the light switch?"

The doctor closed the blinds and sat down beside the bed. He was sweating as he reached for the signal button and pressed it. A nurse came in, blinking in their direction.

"Why don't you turn on the light?" she asked.

"Huh?" said Stone. "They are."

"Nurse, I'm Dr. Rankin. Get me a piece of sandpaper, some cotton swabs, an ice cube and Mr. Stone's lunch."

"Is there anything he shouldn't eat?"

"That's what I want to find out. Hurry, please."

"And some blankets," Stone put in, shaking with the chill.

"Blankets, doctor?" she asked, startled.

"Half a dozen will do," he said. "I think."

It took her ten minutes to return with all the items. Stone wanted them to keep adding blankets until all seven were on him. He still felt cold.

"Maybe some hot coffee?" he suggested.

The doctor nodded and the nurse poured a cup, added the spoon and a half of sugar he requested, and he took a mouthful. He sprayed it out violently.

"Ice cold!" he yelled. "And who put salt in it?"

"Salt?" She fumbled around on the tray. "It's so dark here——"

"I'll attend to it," Dr. Rankin said hurriedly. "Thank you."

She walked cautiously to the door and went out.

"Try this," said the doctor, after filling another cup.

"Well, that's better!" Stone exclaimed. "Damned practical joker. They shouldn't be allowed to work in hospitals."

"And now, if you don't mind," said the doctor, "I'd like to try several tests."

Stone was still angry at the trick played on him, but he co-operated willingly.

Dr. Rankin finally sagged back in the chair. The sweat ran down his face and into his collar, and his expression was so dazed that Stone was alarmed.

"What's wrong, doctor? Am I going to—going to——"

"No, no. It's not that. No danger. At least, I don't believe there is. But I can't even be sure of that any more."

"You can't be sure if I'll live or die?"

"Look." Dr. Rankin grimly pulled the chair closer. "It's

broad daylight and yet you can't see until I darken the room. The coffee was hot and sweet, but it was cold and salty to you, so I added an ice cube and a spoonful of salt and it tasted fine, you said. This is one of the hottest days on record and you're freezing. You told me the sandpaper felt smooth and satiny, then yelled that somebody had put pins in the cotton swabs, when there weren't any, of course. I've tried you out with different colours around the room and you saw violet when you should have seen yellow, green for red, orange for blue, and so on. Now do you understand?"

"No," said Stone frightenedly. "What's wrong?"

"All I can do is guess. I had to remove that sliver of bone from your brain. It apparently shorted your sensory nerves."

"And what happened?"

"Every one of your senses has been reversed. You feel cold for heat, heat for cold, smooth for rough, rough for smooth, sour for sweet, sweet for sour, and so forth. And you see colours backward."

Stone sat up. "Murderer! Thief! You've ruined me!"

The doctor sprang for a hypodermic and sedative. Just in time, he changed his mind and took a bottle of stimulant instead. It worked fine, though injecting it into his screaming, thrashing patient took more strength than he'd known he owned. Stone fell asleep immediately.

There were nine blankets on Stone and he had a bag of cement for a pillow when he had his lawyer, Manny Lubin, in to hear the charges he wanted brought against Dr. Rankin. The doctor was there to defend himself. Mrs. Stone was present in spite of her husband's objections—"she always takes everybody's side against me," he explained in a roar.

"I'll be honest with you, Mr. Lubin," the doctor said, after Stone had finished on a note of shrill frustration. "I've hunted for cases like this in medical history and this is the first one ever to be reported. Except," he amended quickly, "that I haven't reported it yet. I'm hoping it reverses itself. That sometimes happens, you know."

"And what am I supposed to do in the meantime?" raged Stone. "I'll have to go out wearing an overcoat in the summer and shorts in the winter—people will think I'm a maniac.

And they'll be *sure* of it because I'll have to keep the store closed during the day and open at night—I can't see, except in the dark. And matching materials! I can't stand the feel of smooth cloth and I see colours backward!" He glared at the doctor before turning back to Lubin. "How would you like to have to put sugar on your food and salt in your coffee?"

"But we'll work it out, Edgar dear," his wife soothed. "Arnold and I can take care of the store. You always wanted him to come into the business, so that ought to please you——"

"As long as I'm there to watch him!"

"And Dr. Rankin said maybe things will straighten out."

"What about that, doctor?" asked Lubin. "What are the chances?"

Dr. Rankin looked uncomfortable. "I don't know. This has never happened before. All we can do is hope."

"Hope, nothing!" Stone stormed. "I want to sue him. He had no right to go meddling around and turn me upside down. Any jury would give me a quarter of a million!"

"I'm no millionaire, Mr. Stone," said the doctor.

"But the hospital has money. We'll sue him and the trustees."

There was a pause while the attorney thought. "I'm afraid we wouldn't have a case, Mr. Stone." He went on more rapidly as Stone sat up, shivering, to argue loudly. "It was an emergency operation. Any surgeon would have had to operate. Am I right, Dr. Rankin?"

The doctor explained what would have happened if he had not removed the pressure on the brain, resulting from the concussion, and the danger that the bone splinter, if not extracted, might have gone on travelling and caused possible paralysis or death.

"That would be better than this," said Stone.

"But medical ethics couldn't allow him to let you die," Lubin objected. "He was doing his duty. That's point one."

"Mr. Lubin is absolutely right, Edgar," said Mrs. Stone.

"There, you see?" screamed her husband. "Everybody's right but me! Will you get her out of here before I have a stroke?"

"Her interests are also involved," Lubin pointed out. "Point two is that the emergency came first; the after-effects couldn't be known or considered."

Dr. Rankin brightened. "Any operation involves risk, even the excising of a corn. I had to take those risks."

"*You* had to take them?" Stone scoffed. "All right, what are you leading up to, Lubin?"

"We'd lose," said the attorney.

Stone subsided, but only for a moment. "So we'll lose. But if we sue, the publicity would ruin him. I want to sue!"

"For what, Edgar dear?" his wife persisted. "We'll have a hard enough time managing. Why throw good money after bad?"

"Why didn't I marry a woman who'd take my side, even when I'm wrong?" moaned Stone. "Revenge, that's what. And he won't be able to practice, so he'll have time to find out if there's a cure . . . and at no charge, either! I won't pay him another cent!"

The doctor stood up eagerly. "But I'm willing to see what can be done right now. And it wouldn't cost you anything, naturally."

"What do you mean?" Stone challenged suspiciously.

"If I were to perform another operation, I'll be able to see which nerves were involved. There's no need to go into the technical side right now, but it is possible to connect nerves. Of course, there are a good many, which complicates matters, especially since the splinter went through several layers——"

Lubin pointed a lawyer's impaling finger at him. "Are you offering to attempt to correct the injury—gratis?"

"Certainly. I mean to say, I'll do my absolute best. But keep in mind, please, that there is no medical precedent."

The attorney, however, was already questioning Stone and his wife. "In view of the fact that we have no legal grounds whatever for suit, does this offer of settlement satisfy your claim against him?"

"Oh, yes!" Mrs. Stone cried.

Her husband hesitated for a while, clearly tempted to take the opposite position out of habit. "I guess so," he reluctantly agreed.

"Well, then, it's in your hands, doctor," said Lubin.

Dr. Rankin buzzed excitedly for the nurse. "I'll have him prepared for surgery right away."

"It better work this time," warned Stone, clutching a handful of ice cubes to warm his fingers.

Stone came to foggily. He didn't know it, but he had given the anæsthetist a bewildering problem, which finally had been solved by using fumes of aromatic spirits of ammonia. The four blurred figures around the bed seemed to be leaning precariously towards him.

"Pop!" said Arnold. "Look, he's coming out of it! Pop!"

"Speak to me, Edgar dear," Mrs. Stone beseeched.

Lubin said: "See how he is, doctor."

"He's fine," the doctor insisted heartily, his usual bedside manner evidently having returned. "He must be—the blinds are open and he's not complaining that it's dark or that he's cold." He leaned over the bed. "How are we feeling, Mr. Stone?"

It took a minute or two for Stone to move his swollen tongue enough to answer. He wrinkled his nose in disgust.

"What smells purple?" he demanded.

Publisher's Note

You will see from our title page that whilst this issue of AUTHENTIC bears the issue No. 74, it has a publication date of November. You have not lost the October issue! This "skipping" a month is simply to bring us into line with the normal publishing practice of issuing a monthly publication in the month prior to that dated.

BLIGHT

by JOHN ASHCROFT

A GOOD PIONEER SHOULD HAVE NEITHER
CONSCIENCE NOR IMAGINATION—NOT IF
HE WANTS TO BE A GOOD PIONEER

WE WERE LUCKY TO GET OUT OF THE AFFAIR WITH nothing more serious than demotion. I don't enjoy the life of a mechanic, and Harvey hates his new post on S-53 Farm; but there are worse punishments than demotion. What surprises me is that the whole trouble began so innocently.

I'd been on the planet for only three weeks before the assignment came along: a roboplane, flying from Supply Base to Green City with a cargo of equipment for the growing factories, had crashed in the desert after crossing the Iron Mountains. Harvey Lester and I were sent to salvage the wreckage. Our haulage carrier lumbered into a warm sky, and the emerald plastic towers dwindled behind us. We left the prairies, droned steadily and with maddening monotony above the rippled, arid waste for six hours, and landed at sunset by the roboplane.

We walked over and inspected it, frowning and cursing as we saw how battered it was. It sprawled there, wrenched and dented, its metal skin torn in jagged gashes and its back broken across the crest of a dune. The fins were crumpled horribly, all but ripped from the fuselage. The impact had gouged a short trail, flinging heaps of sand to either side.

I stooped, picked up an alloy fragment, and wondered aloud what could have caused the smash. I hardly expected an answer, but Harvey seemed to know all about it.

He said: "Those wretched mountains have some kind of magnetic aura; it's connected, somehow, with the amount of metal in them and the planet's lively magnetic field; the aura clashes with any antigrav unit working on full power. That's why I eased down for the eight miles before we landed. I didn't relish the idea of being blown to shrapnel."

"I hadn't heard about that. But the robo's complete, if not in good condition. Shouldn't it have exploded?"

"Not necessarily," said Harvey. "It may have touched the border—close enough to be deranged, but not enough to be smeared around the horizon. It's happened before. The transport officers will never learn sense."

"Well, we can't haul the carcass home till we've checked the cargo, or what's left of it. I don't want to sleep in the carrier; I'll put the hut together while you inspect the bits."

"Suits me." He got his torch and camera and entered the roboplane through an ugly hole by the dorsal fin. I brought the various parts from our carrier and erected the hut. The ground was far from level, but the floor-plate stood perfectly on its self-adjusting legs, and I fitted the walls, bunks, roof and door, then unrolled an insulated cable from the carrier to the stove socket. Within half an hour a pile of components had become a comfortable little cabin that glowed warmly in the swift tropical twilight.

Harvey walked in and tossed a wad of developed pictures onto the single shelf. "Murder," he said. "The engine must have melted within about ten seconds; I daresay the entire plane trailed sparks a mile long on the dive down. Ha! I've never seen such a mess. The load was tossed all over, and has to be repacked; repairs must be done to the fuselage before we can attempt to lift it. We need another man."

He called by the carrier's radio for a technician to fly out to us as soon as possible. When he returned I had some food ready and we ate slowly as the stars filled the sky. Then we talked about Sirius VII. He was just describing the planned climatic changes when, somewhere, a mournful cry sounded.

"What——"

"Quick!" He jerked the door open and ran out across the sand. I followed, almost knocking him off his feet as he halted abruptly. It was deliciously cool, and the greater moon was ivory vastness; the sheer mountains reared grandly in its radiance, and the dunes were a motionless sea of pale-crested waves spreading for miles and miles in silent, crystal air.

"That noise—what was it?"

"Watch." He pointed at the moon.

I squinted up against its heatless white glare. And then I saw them. It was uncanny. Over the milky disc passed tiny, angular shapes like flies scurrying across a plate. They went from sight, leaving an eerie memory of ponderously beating wings. Another cry rang out, a third, and all the emptiness echoed with hollow hooting that receded towards the Iron Mountains.

I shook my head, blinked wetly, and rubbed my eyes with the chill edge of my hand. "Curse it, I can hardly see. What were they?"

"Let's wander about. I can explain more easily here."

As far as I was concerned it made no difference, but we strolled, shivering delicately, fists in pockets, from the patch of light spilling out of the hut door to the immense bulk of the antigrav carrier brooding over the crumpled roboplane, while towering stone fangs gnawed the sky and the moon transmuted sand to silver all around us; the wind whispered and ruffled our hair, caressing tingling skin with icy fingertips.

"They were reptiles," said Harvey. "Heavy skulls, necks like stalks, clumsy bodies and fantastically powerful membraneous wings. The fact that they can fly at all violates every law of aerodynamics. On the ground they fold their wings; the bone joints are quite ingenious. They stand on hind legs and grip their food with hands connected to the first wing bones; they're herbivores, and very timid."

I asked him where they lived, although I was more interested in the stove.

"They inhabit the swamps north and south of the equator, and migrate seasonally over these mountains. At present, that is."

"Why the afterthought?"

"The climatic changes will kill them. They'll never be able to adapt, so they'll perish. It's as simple as that. Think of it! Imagine that you're one of them——"

"I may be putting on weight, Harvey, but I——"

"Be serious for a minute. Listen. Suppose that you are one of them, a thousand years old, living in those swamps. Every season the rich green water dries away and the trees and reeds droop; then you leave the baking mud; with hundreds more, like you, you fly for two hot days and one cold equator night over the highest mountains on the planet. More green mud, more lush ferns, and you stay there for another season till you have to fly back again, and so on, for year after year. Then the starships land. Along comes clever little man to change the climate. The swamps dry too early. You fly over the mountains and find that the other swamps are dry, too. The whole herd of you chokes to death with lungs full of dust where there should have been water. Pleasant image, isn't it? A whole planet crawling with biped blight."

"Harvey," I said from between chattering teeth, "I've three questions. Why weren't you born four centuries ago? Was that speech unrehearsed, or do you know it by heart? Can't we go back to the stove? I'm freezing."

He grinned sourly. "They all call me a fool. I had hoped that you might be different."

"I'm sorry, but I can't sympathize. This is how it's always been—if it obstructs, push it aside."

"I know; but is that the *right* way?"

"What else can we do? We have to draw a line. You know the old problem: Can the universe be happy if one flea has a sore foot? The climate changes haven't been planned for the purpose of exterminating your pet reptiles, surely? It's just unfortunate that they are in the—— Look!"

A bright pearl was speeding in the air; it grew larger and hummed softly.

"The technician?" wondered Harvey. "He's early."

The small drifter curved around us, descending, and sank onto the sand near the hut. The pilot was tall and thin, with a

pale face crowned by a burst of red hair. He introduced himself as Alan Merrifield. Harvey and I fitted up a bunk for him, and we drank and exchanged banter before discussing the work to be done. But the technical talk palled.

"You got here fast," commented Harvey.

"Yes. I've fiddled with my drifter's motor to boost its performance. I'd have been here sooner still, but I had to drop pace. Danger zone, they warned me. I must have been in it before I remembered. I'm new to this region."

"I'm new to this planet!" I said.

"Oh? Were you admiring our scenery when I arrived?"

"Not exactly. We'd been watching some of those big flying things."

Merrifield frowned, then said: "The reptiles, you mean? Stupid brutes, for all their fat. I was down south last year and a party of us went hunting them. They scrambled about, splattered filthy slime all over us, and hadn't sense even to fly out of their beloved mud-holes. It began as a good laugh; but we were bored before we'd sizzled six of them. What with the Marlinns melting in our hands, to judge from the heat, and the mud and the smell—what's wrong? D'you feel ill?"

Harvey's face was white. "Why go murdering harmless animals?" he demanded.

"Wait. Harvey Lester! That rings a bell now; you're the one who tried to start a movement——"

Harvey flushed. "What if I am? Never mind that. Why should you shoot animals like that?"

"And why not?" asked Merrifield. "They're no use."

"Use! Must you measure everything in terms of use? Destroy it if it can't improve the colony?"

"Why not?" repeated Merrifield, reasonably.

"Because we're only guests on Sirius VII."

Merrifield raised his brows in ludicrously exaggerated fashion. "You imply that those airborne elephants have the power to throw us out, lock, stock and rocket?"

"No, unfortunately. Are you married?"

"What's that got to do with it?"

"Never mind that! Are you married?" Harvey all but

roared the question. I was disturbed—he was far too excitable.

“Yes; but why——”

“Wait and see, can’t you! You’ve a wife and a home in a fine city. How would you feel if some aliens landed and smashed that city, grubbing for ores under the ruins? And what if the invaders went hunting to ease their boredom? How would you like your own wife to be slaughtered before your eyes for the amusement of creatures you don’t even understand? Perhaps you’d feel sorry for those animals you shot! Perhaps you——”

“Oh, stop jabbering,” sighed Merrifield. “You’ll be asking next for an ultimate Right and Wrong.”

“Calm down,” I urged Harvey. “I like an argument, provided no tempers are lost.” I was beginning to agree with him to some extent, but I felt reluctant to say so.

“Sorry, Merrifield,” said Harvey. “I shouldn’t have yelled like that. But let’s approach this from another angle.”

“If you really must . . .” He yawned, winking at me.

“The reptiles have been here for millions of years; we, for a pathetic few decades. We should respect them for that, at least. We shouldn’t rob them of their world.”

“We’re not doing,” said Merrifield.

“We are,” I said. “Harvey tells me the moisture redistribution will exterminate them.”

Merrifield shrugged. “Well, we can’t let a horde of brainless monsters impede progress.”

“But surely there’s room for both species here,” I said.

“No. The climatic alterations are essential if Sirius VII is to become the key planet of Colonized Sector.”

“Listen!” snapped Harvey. “What they ought to do with their oh-so-holy Colonized Sector——”

“It’s late,” I pointed out. “We’ll be working tomorrow. And I want to sleep, even if no one else does.”

Merrifield stretched, turning to the wall.

“That seems to close the debate,” remarked Harvey. “Good night.”

Merrifield did not answer.

Harvey spread his arms in a gesture of helplessness, shrugged ruefully, grinned, and lay down. I switched off the light, loosening my thin clothes for comfort. None of us bothered about removing sandals. The hut was dark and silent beneath the swinging stars. A mournful hoot floated from the Iron Mountains.

"Amen," said Merrifield.

We slept.

I stared up into blackness.

"Are you awake?" whispered Harvey.

Silly question. "No, I'm asleep," I replied sourly. "Did you hear something?"

"Yes. A sort of bump and shuffle. Wait a minute."

I sensed him creeping to the door. I padded after him and found his arm with outstraining fingers. He slid the door open. Light flooded in from the swollen moon half eaten by the mountain teeth. The lesser moons had spun up, palest blue, pink and yellow-white.

"Listen."

A slow, rhythmic sighing; then a hoarse rumble.

"Behind the hut," muttered Harvey. He was down the step and looking round the corner before I could move. He stiffened. I shut the door on Merrifield's gentle breathing, reached Harvey and looked round the corner as he drew back. I'd been expecting the sight, but it was still a shock.

The planes were to the left, glinting coldly. By the carrier, huge and grey, rose an ungainly shape that cast sprawling shadows and pivoted its head this way and that on its long twining neck and unfurled gigantic wings across the night sky. Its lungs groaned, and wide eyes flared as they caught the rainbow moonlight.

"Harvey. You said they were timid."

"This one must be curious. Terrific, isn't he?"

A sullen roar surged, and great feet thumped the shaking sand. The ground quivered and the hut trembled tinnily. Something clutched my shoulder. I convulsed hideously, and

almost laughed in relief. It was Merrifield, his hair in wild disarray. "What's going on?" he demanded.

I told him.

"Wait! I'll scare it off." He sprinted madly to his drifter and returned with a gleaming tube cradled in his arms. "I'm never without this," he said excitedly. I tried to snatch it, but he swerved and rushed past me. "Let me be, you fool; that thing'll trample the hut."

"Harvey! He's got a Marlinn—— Stop him!"

I ran forward and tripped over the power cable. Harvey was sent reeling by Merrifield's frantic shove. And the gun ripped the night into shreds with a blaze of electrical fury. There was a deafening bellow.

I scrambled up and saw the massive creature flapping heavily towards us, dazzled and terrified. It reared enormously, vast eyes flashing. One wing flattened the flimsy hut. Merrifield fired again, again, flinging blast upon blast at the thundering greyness. Anguished roars trumpeted from the tubular throat, and the reptile heaved itself above us in a whirlwind of sand and sound, eclipsing the moons with its thrashing wings. We were thrown down by savage, beating gusts, by a tornado that dwindled, dwindled, dwindled . . .

Stillness.

All was at rest.

We stood up. I dragged the gun from Merrifield and hurled it as far as I could. Harvey cursed him unsteadily.

An acrid reek of blistered flesh needled up our nostrils. The monster was a black spot against the setting moon, and it cried again, a deep, shuddering sob, an icy dirge of a grey ocean crawling from a frozen shore towards a dying sun.

"That's told it who's who," panted Merrifield, triumphantly.

Mist blurred my mind. I grabbed him and punched his face three times as hard as I could. Harvey tugged me from him. For a long moment Merrifield stood swaying, then he made a choking noise and blundered to his drifter, spitting, and wiping blood from his mouth with his knuckles; he shouted

almost incoherent abuse and threats at us and slammed himself into the craft; it sucked up spirals of dust as it sprang away and diminished eastwards with a vicious, rising whine——

A blinding blue flash lit the sky and a shattering detonation rattled the ruins of the hut. Scorching waves of air buffeted us as we ducked instinctively. Blobs of dripping plastic and bits of smoking metal formed fantastic hail pattering onto the desert. The harsh tumult rolled off into hollow, flat distances, rebounded in muffled memory from the Iron Mountains, and faded gradually into moon-silvered silence.

I straightened, wincing. My ears rang with a piercing note. I thought of Merrifield's drifter and of the danger zone, and looked in horror at the red stains on my bruised fists. I had helped to kill a man. My hands shook.

Harvey brought the undamaged stove from the wreckage and connected it to the cable again. It spread warmth into the bitter wind that was beginning to rustle and moan around us. Somehow, we never thought of sheltering in the carrier.

"He asked for it," said Harvey. "I don't care what happens to us. I'm glad he got killed. He deserved it, the swine."

"Harvey!" I gripped his arm. "A man's dead. Don't you see that? He was married; maybe there are children. Now he's dead—all through your quarrel about animals!"

He jerked round. "Why, you were as much——"

"I know, I know! I'm not trying to blame *you*! But a man is dead. Harvey, tell me this, for the love of God: Was it right that he should die?"

He looked at the ground, at the pieces of the hut, and at the cold twinkle of metal out there that was the gun. He sagged, then swore and kicked spurts of sand into the air. "I don't know. I . . . I . . . Oh, shut up—I *just don't know*!" He stalked off and stood staring at the mountains, hunching his shoulders, with his face to the chilling moonlight and his back to the freezing wind.

I crouched down by the stove and waited for the dawn.



JOHN MORTIMER

TRADITION

by J. T. McINTOSH

*THERE ARE ALWAYS GOOD REASONS
BEHIND TRADITIONS. SOMETIMES THE
REASONS BECOME FORGOTTEN. BUT
IF A SMART MAN REMEMBERED THEM?*

LIEUTENANT CRISP PUSHED TWO CRATES ASIDE, SWAYED easily and unconcernedly as something jarred the ship, and said, in a normal conversational tone: "All right. You can come out now."

A man's head, his face blackened with soot, appeared above the crates. He was grinning wryly. "I'd have had to come out soon, anyway," he admitted. "But I meant to stick it out a little longer. We're too far out to go back, I hope?"

"Far too far. Sergeant Roberts!"

"Sir!" A giant of a man appeared beside the lieutenant, his eyes widening as he saw the stowaway.

"Sir?" said the stowaway dazedly. "Is he blind?"

The lieutenant grinned faintly. "Come on out," she said.

The man moved the crates and stood in a parody of attention before her. He rated high in impudence, Anne Crisp thought, like a cheeky gypsy with his black face and ragged clothes. But he didn't talk like a gypsy, and anyone who meant to hide in the shadows of a spaceship's hold would blacken his face and dress in rags. His impudence was another matter. Given a chance she would take him down a peg or two.

"Now you take me to see the captain, don't you?" remarked the stowaway.

"That's right. What's your name?"

"Alan Gladwin. But I should have said John Smith, shouldn't I? What's yours?"

"Lieutenant Crisp."

"And the other part? There is another part, isn't there? They didn't christen you Lieutenant."

Anne took him by one arm and Roberts by the other. He was no taller than Anne, and she wasn't tall, even for a woman. They could have carried him between them with his legs in the air.

"Why did the sergeant call you sir?" Gladwin asked.

"You talk too much." But she answered his question. "Tradition," she said. "The crew of the first spaceships were all men, and the articles of the navy are written solely in the male gender. Women in the navy sign on as men and refer themselves as men. But it's only conventional. There's no pretence, except formally, that they really are men."

"You don't say," said Gladwin, and murmured something regrettably audible which would have made Anne blush if she'd been anything but a lieutenant in the navy.

"What happens to me now?" he asked.

"You're tried, sentenced to death, and shot," she replied casually.

"That's not very funny."

"Not to you, I suppose. You shouldn't have chosen a naval ship. You'd have been all right on a freighter."

"But there isn't a freighter to Pluto for months!" He was beginning to lose his impudence now, not unnaturally, and Anne took a malicious pleasure in the change. He should have known better than to stow away in the *Arachnid*, knowing so little about the navy.

The captain was like a film major or skipper, stocky, grizzled, heavy-browed. He showed no more surprise at seeing Gladwin than Anne had done.

"Stowaway, lieutenant?" he said, with one raised eyebrow.

"Among the provision, sir."

"How did he miss the ground check?"

"I imagine he moved about during the search and was lucky. He tried to do it again, just now, but I heard him."

"Very well, sergeant, send in Lieutenants James, Hill and

Cutter. If you can't find any of them, send one of the sub-lieutenants instead. And hurry. I want to get this over with."

They waited as the sergeant saluted, went out and closed the door. The captain remained seated at his desk, impatient, trying to concentrate on the papers before him, but distracted by the business in hand. Anne stood at ease, neat and efficient-looking in her dark blue jacket and razor-edged slacks, ash-blond hair tucked under her white cap. She kept one eye on the prisoner, who moved uneasily from one foot to the other, small, curly-haired, dirty, refusing to believe that they would really shoot him, but afraid that they just possibly might.

The door opened again and two men and a woman entered. One of the men was hardly more than a boy, a tall, friendly-looking youngster who couldn't have been a lieutenant long. The other was much older, as old as the captain, but without his commanding presence. The woman was middle-aged, but looked fit, tough and fearless.

"We won't need chairs," said the captain. "Stand here, gentlemen, please. This won't take long."

Gladwin was reminded involuntarily of what Anne had told him. The captain didn't say "Ladies and gentlemen" as the ear expected. Even if you were thinking of something else the single word, when you expected three, caught your attention and you wondered for an instant what it was that had sounded strange.

"Lieutenant Crisp, report, please," said the captain.

Anne stepped forward and stated briefly where she had found the prisoner and what he had said. Then she stepped back in line. But there was no stiff formality. It was like the performance just before the dress rehearsal, everyone taking it easy.

It went so quickly and easily that Gladwin was shocked to realize he had already been tried, found guilty and sentenced, while he was still looking for something to say.

"Wait," he exclaimed. "You can't——"

"Lieutenant Hill," said the captain. "Detail the firing party."

The older of the four lieutenants said: "Yes, sir"—no salute; 'yes, sir,' not 'aye, aye, sir'—and left the room. The

others, at ease now that the trial was over, looked curiously at Gladwin.

It was unreal—anything connected with one's own death is unreal, even when it is happening. No sane, healthy man ever unreservedly believes that he is just about to die.

"For heaven's sake!" Gladwin exclaimed with something of his old spirit: "Can't I even wash my face first?"

"Better not," said the captain dryly. "You'll show up better as you are against the light walls."

That silenced Gladwin so effectively that he said not another word as Hill came back and they led him to a bare gallery high in the ship where four men, with guns, under Sergeant Roberts, were waiting. They were men, Gladwin thought dazedly, although one of them looked very like a girl.

He refused the formal offer of a bandage over his eyes. Searching his mind for something to stop the shooting he remembered the package he had found in the hold. He opened his mouth . . .

"Fire!" the sergeant ordered.

The gallery was full of sound. Gladwin fell involuntarily and scrambled up, red with shame.

"The firing party seems to have missed," said the captain calmly. "In accordance with regulations we can now press him for five years' service. Lieutenant Crisp, please see to it." He and the officers, and the firing party, left Gladwin with Anne and Sergeant Roberts.

Gladwin looked at the wall behind him. No one had missed. The guns had been loaded with blanks.

"Another tradition, I suppose," he said bitterly.

"Yes," Anne told him, smiling at the recollection of Gladwin falling, sure he must have been hit. She didn't say so, but he knew it, and went red again. "In the early days," she went on, "when ships were powered by rockets, the payload was worked out to the last ounce. There was nothing over. Spacemen sweated in steam baths before take-off, bringing themselves down to a fixed weight like boxers. Provisions were just enough to keep everyone alive."

She snapped her fingers. "One man extra, and the trip was impossible. They either couldn't reach their destination, or

they'd starve before they got there. They couldn't turn back, because they didn't know how. It would have taken a month to make a vast curve, and all the fuel would be gone. So there was only one answer. Shoot all stowaways and drop their bodies in space. It became legal. It still is, though the need for it has gone."

"I suppose you couldn't give me a hint?" asked Gladwin. "You had me thinking I was going to be shot. Is that tradition, too?"

"No. For one thing, most people know a little about the navy. There's plenty of books about it, you know, if you take the trouble to read them. And then we've been known to give stowaways a hint that we don't really shoot them any more. But you were sticking your neck out, so I let you think what you liked."

"That was nice of you," said Gladwin sarcastically. "Did I hear someone say something about my joining the navy?"

"Yes. The guns are loaded with blanks, and you sign on. It's automatic."

"Is it hell. Five years in the navy? No thanks. You can lock me up."

Anne's face didn't change expression, but the sergeant grinned.

"What now?" asked Gladwin suspiciously.

"If you don't sign on, you're shot again tomorrow morning. Then the next morning. And so on every twenty-four hours. But while it's traditional that the guns are loaded with blanks the first time, by the third or fourth time it's at the discretion of the captain and the gunnery officer—that's Hill—what they're loaded with."

"You mean they really will shoot me? Or are you just trying to frighten me into signing something?"

"Let's take him below, sergeant," said Anne. They grasped his arms as before. He tried to shake them off, but the sergeant hardly noticed his efforts, and what Anne's grip lacked in strength it made up in science. He was helpless.

"You've made a bit of a mess of this, haven't you?" Anne remarked. "You decide to stow away on a ship to Pluto, which was stupid. They'd only send you back, anyway. You

pick a naval vessel, knowing nothing about the navy, which was stupider. Almost anyone could have told you that meant five years in the navy. And to crown your stupidity, you pick a ship that isn't going to Pluto anyway."

Gladwin's mouth fell open and he didn't seem to have the strength to shut it. "Isn't going . . ." he repeated blankly.

"Of course, you couldn't know that. We're still on a course for Pluto in case anyone is watching us. But that won't last much longer. You had to pick a ship on special duties. You know what that means? We're not on a routine patrol. If we were, the captain might have you shot with blanks every morning. But this is business, so if you don't join up it won't be long before one of those blanks has a sting."

"Okay," said Gladwin disgustedly. "I'll join. If I'm not going to Pluto I'd have to join the army or the navy, or something, anyway."

"Why, what did you want on Pluto?"

"A man who's got all my money. People who wanted to run out used to go to Africa or South America. Now they can go much further. Oh, well. How long will it take me to be a captain?"

"Ask Captain Crisp."

"Crisp? He's not——?"

"Yes, when we're in port he's my father. Out here he's just Captain Crisp. We forget the relationship. That's another tradition."

"Tradition," said Gladwin. He spat on the word and ground it under his heel. Or at least he made it clear that he wanted to.

That was Alan Gladwin's introduction to the navy. He could hardly guess then that that story was going to pass into tradition, too . . .

Spaceman Second-class Gladwin threw his mop at the floor as if he was trying to drive it through two inches of steel. As a matter of fact he was.

"Spaceman Gladwin," said a soft voice. He turned and saw Sergeant Roberts, who had a gentle voice for such a big man. "You don't like work, Spaceman Gladwin," said the

sergeant sadly. "You'd rather have another couple of days in the brig."

"Look," said Gladwin. "I realize there's not much to do in space and that naval ships have four times the men they need simply to run the ship. I understand that you must have men doing all sorts of unimportant little jobs just to keep them busy. But must they do anything as silly as polishing shiny decks?"

"Silly," murmured the sergeant, fingering his chin and obviously wondering whether it should be three days instead of two.

"The same thing," said Gladwin, "is done for so long that you don't question it any more. That's your damned tradition again. You know down in the hold it's always stifling and up in the bows it's freezing? These floors should be painted black instead of kept shiny. Each deck would absorb more heat from the deck below. And it wouldn't be quite so hot in the hold and not quite so cold in the bows."

The sergeant surveyed him for a moment, then left him.

Half an hour later he was back, carrying a tin.

"Spaceman Gladwin," he said, "you've got your first good mark. Now get a brush and paint the deck black."

Spaceman First-class Gladwin sat with the whole ship's complement except Lieutenant James, who was in the control room, and listened to Captain Crisp.

"Our mission," he said, "is the capture of the Wreckers."

Nobody laughed. But one or two spacemen and junior officers failed to suppress grins.

"I know," said the captain wearily. "You've heard that before. So has the crew of every ship in the navy—more than once. And our two great successes have been the capture—if you can call it that—of two abandoned bases. Sometimes patrols have had more to go on than we have now. But we have two small advantages. First, the *Arachnid* is supposed to be on her way to Pluto, and it would be a long time before we'd get there. So even if the Wreckers' spy system is as good as it's supposed to be they won't expect any danger from this ship for at least two months. By that time they'll know we're

not on Pluto and will wonder where we are. Second, a beam we had on a Wrecker ship gave us what might be a lead. The ship started from a wreck on a course for Mercury, which meant nothing. But before they'd managed to blanket the beam—and after they probably thought they had—they were making for Venus. So we have a chance. I know we'll have to cover millions of square miles of jungle and desert, and if we're seen doing it we'll be wasting our time. But it's a chance."

Spaceman First-class Gladwin made a few preliminary sweeps across the graph paper and firmly drew a neat curve.

"Very nice," said Lieutenant Crisp caustically, "but what's happened to the reading for P6?"

"It would spoil the curve," said Gladwin brightly. "So I left it out."

"It wouldn't do to spoil the curve, of course," Anne admitted. She was taking the advanced navigation class. "Even if your correlates meant that your theoretical ship—just as well it's theoretical—was going to take a dive into Jupiter."

"But it wouldn't," said Gladwin mildly. "You cheated, lieutenant. And misled all these fine young lads." He indicated the rest of the class with a sweep of his arm. "The reading at P6 was obviously a stationary correlate. And your ship's doing 35,160 m.p.s. So everyone gets a smooth, normal curve with a pimple on it. Which is absurd."

"Don't be too pleased with yourself, spaceman," said Anne. "But the rest of you ought to know better."

Corporal Gladwin looked around to make sure no one else was within earshot and asked softly: "Sergeant, what exactly *are* the Wreckers?"

Roberts stared at him. "You mean you don't know——"

"Not so loud. I don't want my inferiors to think I don't know anything. It wouldn't be good for discipline. You're a nice fellow, sergeant. You're fair-minded. So I asked you."

"Where have you been the last ten years?"

"I'm going to trust you with a secret, sergeant. Is it safe with you?"

He looked around again and whispered: "I'm a hick."

The sergeant was used to him by now. "Let's have it in English," he suggested.

"I lived in the country all my life. Never went near the big wicked cities. Had a job in a garage, but soon I found I owned the garage, then two or three garages. Don't know quite how it happened."

"I can imagine," said Roberts ironically. "You just can't help climbing. Seems to come natural to you, even in the navy. If you fell into tar you'd come out smelling of roses." Only he didn't say "tar." "Well, go on," he invited.

"Outside of the big cities it doesn't seem to matter much about naval tradition and space travel, and the Wreckers and so on. I never paid much attention. I never meant to leave solid ground until someone made a beautiful sucker out of me and left for Pluto with my last cent. And that brings me up to date. But what I mean is, the Wreckers never bothered me and my garages, so anything I ever heard about them went in one ear and out the other."

"There's not much to know," said Sergeant Roberts. "They use an ordinary ship, very like this one, and there's nothing remarkable about their powers, except for one weapon. That's enough. They appear from nowhere—that's easy enough if you know a ship's course, and they always do. You set a course to intercept at right angles or bigger. If you do it properly you're there before the ship has had time to do more than squawk. After that nothing is heard of the ship until it's found drifting, everyone in it dead and everything worth looting gone."

"And why aren't the Wreckers caught?"

"Space is big. Even the solar system is big. And ships are small. The Wreckers' ship always has a start of at least five million miles, because they never attack any ship that isn't that much from a planet or another ship—unless they're going to board the second ship, too. And you just can't chase a ship that has a five-million-mile start. You can put a radar beam on it, but that can be distorted and, anyway, the limit is about ten million miles."

"Have you ever seen a ship that's been looted?"

"No, but Lieutenant Crisp has. Ask her."

"Thanks," said Gladwin. "I will."

"Can I speak to you, sir?" asked Corporal Gladwin.

"You're doing it," said Anne briefly.

"Privately, I mean."

Anne glanced round. "There's no one here," she said.

That wasn't what Gladwin meant, and she knew it. But he took it as assent.

"Sergeant Roberts tells me you've seen a ship looted by the Wreckers," he said. "What's it like? Exactly what do you find?"

"If I tell you," said Anne slowly, "will you tell me something, too?"

"If I can."

"What would you say if you were asked to prove, this minute, that you're not one of the Wreckers yourself?"

That silenced Gladwin for only the second time since he had boarded the *Arachnid*.

"This is as far off the record as you like," said Anne. "You can even call me Anne if you feel like it."

"Well, that's something," said Gladwin, recovering a little.

"The question hasn't arisen yet, but it may. I don't think you're a spy, or I wouldn't be warning you. But look at it this way. You're a corporal now, with more than half the ship's company below you in rank—yet you never went through the rigorous tests and questioning every recruit undergoes. It would have been very clever for the Wreckers to plant a stowaway on this ship, like you, if they discovered its mission, knowing he'd be pressed into service."

"So it would," Gladwin admitted. "Only they didn't."

"That's your story. How would you prove it?"

Gladwin hesitated. "I don't know."

"There's more I haven't mentioned. Your career in the navy looks like being meteoric. You're supposed to know nothing about the navy or space travel or ships, and yet you never put a foot wrong. See how it adds up?"

"I see. It's nice of you to warn me. Unless——"

"Unless I was told to do it?" Anne grinned.

"Perhaps I should be shot for putting you on your guard. But I thought I'd better tell you not to distinguish yourself too markedly if anything happens. If you're seen, to take a hypothetical case, chasing a Wrecker into a Venusian forest, someone is liable to shoot you in the back."

She stopped, leaving Gladwin with food for thought.

"Now, you wanted to know about the looted ships. Nothing is harmed in them except that everyone is dead. They've obviously died in the same instant. People who were eating, sleeping, reading, talking, making love, dancing, have died on the spot. And the only thing to show that the ship has been boarded is the absence of anything of value."

"How far does that go?"

"You'd never believe how far until you see a looted ship yourself. All money and jewelry is gone. You won't find a single cent, nor necklace, wedding ring, even a silver tiepin. Women's furs are gone, unless they're quite valueless. Cameras, watches, silver pencils, even clothes."

"But——"

"I know. How is it disposed of? Every source of supply has been checked. With no result. There must be a vast organization for the disposal of loot. Or perhaps it's all stored somewhere—unlikely, for so many of the things that are gone would go out of date soon."

Gladwin thanked her, and thoughtfully wandered away. At the door he came to life, turned with a grin, and said: "Say, Anne, can I forget we're in the navy for another sixty seconds?"

"No," said Lieutenant Crisp flatly.

"I thought not, sir," replied Corporal Gladwin.

Corporal Gladwin swore suddenly and added something distinctly uncomplimentary to himself. He spoke aloud, but no one looked up in surprise to hear Gladwin admit he was fallible. He was alone in the cabin he shared with three other corporals.

He had only just remembered the packet he had found in the hold. He had had a lot of time to investigate in the two

days he had spent there—but no light. So when he found a packet in an unusual place—between a strut on a crate and the crate itself—he put it back carefully and decided to investigate later.

But he had never remembered it except just for an instant before the firing party shot blanks at him.

The probability was that it contained drugs or some other form of contraband, evidently intended for Pluto. Already, as he rose from his bunk, he was wondering how he could make use of the accidental discovery to win another promotion. It was fully five days since he had been made a corporal.

But it might be as well, he told himself cautiously, to see what was in the package first.

He was careful not to be seen on his way to the hold. It would be very awkward for him, considering what Anne had told him, to be found with contraband of some sort in the hold—especially since he had had so long to report it.

But no one went near the hold, as a rule. He found the package and opened it carefully. Now he had a key for the light, and he could examine the contents closely.

There was a set of papers proving the identity of Mr. Philip Nilson—without photograph or description. Gladwin didn't know much about identification papers, but these looked as if they must make the bearer pretty important. There was no point in hiding useless papers so carefully.

There was a paper which bore what seemed to be the key to a naval code. It was not complete. It looked as if someone was slowly working it out—or slowly collecting data. There was a packet of pills. Gladwin didn't know what they were, and he didn't swallow one to find out. A set of keys completed the hoard—curious little keys which felt alive under his fingers. He guessed they were moulders, which only had to be left in a lock for half an hour to become perfectly capable of opening that lock at any time.

Carefully, Gladwin replaced everything. He would probably be a pretty good chess player, he was telling himself, if only he played chess. For already he was three moves ahead and was considering the fourth.

Disregarding the three obvious moves, he made his guess about the fourth and decided this had nothing to do with the Wreckers. But move number five was—need anyone know that?

If Alan Gladwin was to keep climbing in the navy, he told himself, no one need know until he was ready. That was, until he was a sergeant.

But now he had to make the first three moves.

"Can't even go into the hold now," Gladwin complained, "without being reminded of Central Park on Saturday night. What's the navy coming to?"

There was a shout of laughter, for Gladwin was popular and had a gift of saying things so that "Good morning" sounded like a good joke. The idea of Gladwin being concerned about the good name of the navy was worth a laugh any time.

"I'm serious," he said. He was in the big messroom. About forty men had just heard him sing "Killarney" in the manner born. "There's such a thing as dignity, and when you find young Smith hugging Cutter in a corner——"

The roar could have been heard all over the ship. Smith was seventeen and Lieutenant Cutter the other side of forty. Even Gladwin had to grin at his own remark, and Smith, red as a beetroot, added to the fun by insisting hotly it was a dirty lie.

Gladwin left the subject, for he had done all he intended.

Someone—he didn't know whom—would become uneasy at the mention of the hold as a petting park. He might not take the suggestion seriously, but he would take a look to make sure that a certain package was safe.

And the best time to do that would be in a few hours time, the main rest period—the "night" of the *Arachnid*.

Gladwin looked anxiously at the plate in the developing bath. He knew the risk he had taken. He hadn't seen the man in the hold, only taken the dark-light photograph. If the plate didn't show who it was, his whole scheme would have been a miserable failure. Perhaps an unpardonable failure,

considering that Gladwin had been working on his own on a job the captain should have known about.

He might have done many things. He might have flashed a light in the face of the man in the hold. He might have positioned himself so that he could see whoever went to the hold. But he had wanted to hear the man go straight to the package.

There was the risk that the man, whoever he was, might take the packet away. He hadn't taken it away, however. Reassured, the man in the dark had put the package back and gone away.

Gladwin sighed in relief as shadows began to form on the plate. Long before the developing was complete, he knew who the man was. It was Sergeant Thomson, 'There wasn't a possibility of doubt.

"The plan," said Captain Crisp, "hinges on the assumption that the Wreckers, knowing where every naval ship is, or should be, and knowing particularly the movements of those near Venus, may be less cautious than usual. They're about due to make a kill."

He surveyed the select group crushed in his cabin, all the ship's commissioned and non-commissioned officers. Corporal Gladwin was in, but only just. He was the most junior officer present.

"We can't concern ourselves with that," he went on. "Even if it's near here we ignore any distress signal and lie doggo. It has gradually become clear that the most vital part of any Wrecker operation, the part most carefully planned, is the return to base. Their ship must be assured of a clear run home. Well, the Wreckers must think that in the next five days it has that; the movements of naval and merchant ships allow a ship a clear run to any location in the northern hemisphere of Venus. They can't know we suspect that Venus is their base, and they can't know the *Arachnid* is here."

"I take it, sir," said young Lieutenant James, "that only one ship was detailed for this patrol because more couldn't be withdrawn secretly from other duties?"

"Exactly. We have in effect, invited the Wreckers to

attack a ship during the next five days—unfortunate, but necessary—and permitted them, by our schedules, to dive straight and openly for their base. If this base is on Venus, I think we can guarantee to find it merely by lying over Venus's North Pole for one twenty hours. It's——"

"Sir," said Corporal Gladwin suddenly. Heads turned in his direction. Junior officers couldn't make suggestions direct. They had to make them to a lieutenant, who would pass them on to the captain if he thought them worth it. Gladwin knew this, among many other things about the navy that had been a closed book to him only a few weeks before.

"I know this is irregular, sir," he said, "but I think before you go on you should know there is a spy among us."

In the uproar Gladwin stayed very close to Thomson, even when officers were searching the sergeant. And he did all he could to detract from the effect of Thomson's sincere amazement when the contents of the package were found in the lining of his jacket.

"It's a plant," Thomson yelled. "I never saw these before in my life. I——"

The captain was shouting for silence, but for once no one paid any attention. Anne was watching Thomson and Gladwin curiously, her hand on the paralyzer at her hip, just in case. James was puzzled. Cutter was refusing to believe it. Hill was beside Thomson, watching him closely.

Gladwin caused another surprise by being able to shout everyone else down. "Never mind about whether it's a plant or not," he bellowed. "Remember, Thomson, you never saw them before in your life."

He handed a photograph to Hill, who took a quick glance at it and handed it to Captain Crisp. It showed Thomson plainly in the hold, examining the articles which had just been found on him. He was examining them by touch, but that made no difference.

Thomson didn't see the picture, but the reaction of the officers who did were enough for him. Before Hill knew the danger, Thomson had grabbed the paralyzer from his hip and swung it at Gladwin.

Two beams sizzled as one. Gladwin and Thomson dropped silently.

Anne Crisp put her paralyzer back in its holster. "I'm afraid I've killed Thomson," she said. "Pity he got Gladwin. He——"

"Me?" said Gladwin, rising to his feet. "When someone shoots at me, I have sense enough to drop. Particularly if regulations don't allow me to carry a gun."

If there had been uproar before, it was a whisper to the noise that broke now.

"That was sheer melodrama, sergeant," said Roberts, naturally emphasising the last word, as a sergeant who had seen a man enter the service and climb to equality with him, all in three weeks—and starting as a stowaway, which was a tremendous disadvantage. He didn't deny that Gladwin deserved his incredible promotion—but still he emphasized the word "sergeant."

"Nothing of the kind," said Gladwin indignantly. "I had to catch Thomson off guard. At a moment when, of all moments, he had every reason to think himself safe. Of course, the man was unlucky. I suppose he had to carry a set of false papers——"

"You know damn well he never carried them about with him. Think I'm dumb? You planted them. You found where he hid them and put them in the lining of his jacket instead. That's what you told the captain afterwards, isn't it?"

Gladwin grinned and nodded.

"And you must have made a good case for playing it that way," added Roberts, "or the captain would have had you shot as well."

"Of course, it was all blind luck," Gladwin admitted. "Finding the papers in the hold and——"

"That's right, be modest," grunted Sergeant Roberts. "It's a change, anyway."

"I'm not being modest, only seeing Thomson's point of view." Gladwin looked at Roberts, grinned again and couldn't resist telling him the rest. "The most ironic thing

about it," he said, "is that Thomson probably had nothing to do with the Wreckers."

"Huh?"

"He'd been in the navy four years. He was obviously some sort of political spy or agent, reporting to some country or faction on the morale of the navy or its technical secrets. I'd give you ten to one he knows no more about the Wreckers than I do."

Roberts stared, then grinned. "You didn't mention that when the captain was saying all those nice things about the menace to our mission removed by your sagacity."

"I didn't think," said Gladwin mildly, "it would be expedient. They might not have made me a sergeant."

There was no answer to that. At least, Roberts couldn't find one.

Her motors dead, the *Arachnid* was in an orbit over Venus, not a light showing. In the control room were Captain Crisp, Lieutenants Hill, James and Crisp, Sub-lieutenant Neston and Sergeants Roberts and Gladwin. They were staring, from the captain down to Gladwin, with the same incredulity at the working-out of a thousand to one chance. Clearly visible by her flaming exhausts was the Wrecker ship, dropping across the sky. It could be nothing else. And a ship's exhausts could seldom be seen across more than three hundred miles. They had picked the perfect spot for a grandstand view.

"Base of Mount Philippa," whispered James, who knew Venus. "We'd never have guessed. It's far enough from New Paris and Media to be safe, but only just. No one would ever have looked so close to two naval stations for the Wreckers' base."

The faint, shooting glow was gone. The captain shook himself slightly and resumed his responsibilities.

"First, the launch goes to Fettenburg," he said. "We can't risk radio, and New Paris and Media must be alive with spies. Fettenburg's right on the other side of Venus. Should be the best place to take the news. I'll have to send a lieutenant and a sergeant." He looked round. Everyone tried not to

call attention to himself. "You, James, and you, Roberts," he said.

The others relaxed. "But, sir," protested James. "I know Venus. I was here for five years."

"That's why I'm sending you. They know you at Fettenburg, and that always helps. Besides, I want you to get there without anyone knowing the *Arachnid* is around. I think you can manage that best."

"Yes, sir," said James.

"Make your arrangements and go now. I'm not sending any written dispatch. You know what to say."

"Yes, sir." James saluted and was gone, taking Roberts with him—two disappointed men.

"I'll take the helicopter and reconnoitre," said the captain.

The procedure reversed itself. Everyone tried to catch his eye.

"Lieutenant Hill, you must remain, of course," said Crisp. Hill merely nodded. If the captain was going, Hill clearly had to remain. "I'll give you orders in writing." In case he didn't come back, but there was no need to say that. "I won't take a lieutenant," the captain went on. "Neston, you're in. And Gladwin. Neston, please select seven men. I'd like two corporals among them."

No one said anything, but everyone realized that the captain had been guilty of human feelings. A lieutenant should have gone on such an expedition, but the ship's complement was four. With James gone, Hill in temporary command of the ship, and Cutter—the middle-aged woman Gladwin had first seen at his conventional trial—needed as navigator, the only lieutenant left was the captain's daughter. So he took no lieutenant. Anne bit her lip, but there was nothing to say.

Gladwin was surprised that he was included. There were plenty of other sergeants. He was under no delusions about the trust placed in him. His discovery of the spy meant nothing, for after the matter had been considered more calmly, it was obvious to everyone, as it had been to him from the beginning, that Thomson had not necessarily been a Wrecker.

In fact, as Anne had remarked to him, he was making himself a little too conspicuous. Why take him on this trip if he was still under suspicion?

Then he realized that he was going *because* he was under suspicion. The captain would see he had no opportunity to do any damage, and would be able to see his reactions.

"It can't be as easy as this," Captain Crisp murmured. He was confiding his fears, strangely enough, to Gladwin. Neston was flying the machine, and in that ill-assorted party as regards rank the captain could only talk to Gladwin.

"I'm afraid you're right, sir," said Gladwin.

The Wreckers' base could only be under an overhang at the foot of the thickly-wooded mountain. It was almost dusk and the helicopter was using the P-ray—the whole skin of the vessel was enveloped in a refracting field that bent all light rays round the ship and straightened them out again. So it couldn't be seen. The squeaker was on, too—a sort of relay station that soaked up radar beams, modified and sent them on in such a way as to convey the lie at the other end that there had been no interruption. So the helicopter couldn't be detected, unless the Wreckers had something a long way ahead of current science. Moreover, the funk-relay was on. Any moment that something the relay didn't like or understand happened—a particle bombardment, entry into a live field of force, the hundred other things that could mean danger—the helicopter would instantly be wrapped in the effective, but noisy, sound shield and would be shooting up on an erratic course with all the power of vanes and jets.

But no one seemed interested. A ship had landed. They had seen it because even the P-ray can't hide exhaust fumes. It could only be under that overhang. And round about were no roads, no tracks, no guards, nothing.

"Could be," said the captain, "that there's no real defence, but a good hiding-place. But this ray, whatever it is that kills through all defences—why doesn't it surround the base? The P-ray and the squeaker are well enough known. But they let us come down and see exactly where their base must be, and nothing has happened. Suppose we drop an

atom bomb on the mountain—what's to stop us? It will do a lot of damage in New Paris and Media, but that can't be helped."

He looked broodingly at Gladwin. "What would you do, sergeant?"

It was without precedent. No captain conferred with a sergeant. Gladwin answered warily. "How do you see the alternatives, sir?"

"We either drop right down and have a look under that overhang, or go back to the ship and drop a bomb."

"Then we obviously go back to the ship, sir."

"That being so, I think we'll drop and have a look."

So that was it. Anne had given him fair warning. The captain was using him as a sort of weather cock—or pretending to.

Gladwin looked round. No one else could hear them. The captain wouldn't have talked as he had otherwise. Gladwin might be a spy, but he was certainly a sergeant in the navy.

"I see your point of view, captain," he said. "But I know you won't do the wrong thing merely because I, under suspicion, don't want you to do it."

"No," said the captain moodily. "But I wish I knew about you, Gladwin."

"So do I sir, but what can I say or do? Whatever I tell you, you can believe me or not. But since we're talking informally, sir, do you mind if I'm frank?"

"I'd be glad of it," Captain Crisp said drily.

"As I see it, sir, you can only do two things with me. Lock me up as a suspected spy, or trust me. If I'm a spy, you've put me on my guard now. If I'm not, and you lock me up . . ."

"Yes?" the captain prompted. "Will it really make much difference?"

"I think it might. I'm a man of ideas, sir, and I'm beginning to get one now."

The captain smiled mirthlessly. "You don't underestimate yourself, anyway, Gladwin," he observed.

"No, sir. I think that's always a bad mistake."

"All right. I'll trust you. Tell Neston to return to the ship."

The *Arachnid* was slowly edging over the foot of the mountain. With her drive on, the ship could have covered a million miles in the time it was taking her to edge two. But the drive couldn't be concealed. So the helicopter was towing the ship into position for her attack.

Lieutenant Crisp found Gladwin in the rear control room—merely an emergency installation in the rear of the ship in case the forward part was damaged.

"I see you're trusted now," she remarked informally. "Or else someone forgot you."

Gladwin looked round at her, frowning.

"You were here alone. You could have given us away to the Wreckers, if you liked. Or damaged the ship." She looked keenly at him, looking suddenly very like her father. "If you were a spy you would have done, wouldn't you?"

"No," said Gladwin.

"Why not?"

"Because if I did, Sub-lieutenant Neston would come out from behind that bulkhead and say 'Caught red-handed!' or words to that effect."

There was a muffled curse from behind the bulkhead indicated. Anne grinned. "You may as well come out, Neston," she said. The sub-lieutenant appeared, looking sheepish. "It's not your fault. Gladwin has second sight or something."

"When does the bomb go?" Gladwin asked.

"Any minute now."

Gladwin jerked his head up. "So soon? I thought—Anne, I've thought of something. I want to see your father."

"You can't. He's busy."

"Lieutenant Crisp," said Gladwin formally, and saluted. "I request an immediate interview with the captain."

Anne refused to be formal. She shrugged. "It's your funeral," she said. "He won't like it."

"Maybe he will."

In two minutes he was saluting the captain.

"You again," said Crisp.

"Yes, sir. I get around." He went on rather incoherently. "Sir, I told you I had ideas. I think I know what the

Wreckers' weapon must be. You know naval vessels never fly in line, always in echelon. That's what started the train of thought. And the fact that the Wreckers' field, whatever it is, doesn't surround the base. I——"

The rush of words stopped. This was formal, not like the conversation on the helicopter. He couldn't go on as Sergeant Gladwin.

The captain smiled involuntarily. "You're a cheeky devil, Gladwin," he observed. "All right. You're promoted acting sub-lieutenant."

"First, may I suggest that you send Lieutenant Crisp to delay dropping the bomb for a while, sir?" said Gladwin.

The captain frowned. Gladwin went on hurriedly. "I think it will fail, and I believe you do, too, sir. The Wreckers, apart from their one weapon, probably aren't far ahead of us—but there's no reason why they should be behind. They must be covered by a sound shield. Which means the bomb will only let them know we're here and give them a chance to escape."

"And do you think they'll succeed?"

"Yes, sir. They must have several ships. If four or five come darting out, what are you going to do? Whether they fight or run, I doubt if we'll get more than one of them before they get us. The second thing you can do is wait—but I think you know that as soon as Lieutenant James gets to Fettenburg the Wreckers will be warned."

"So?"

"Attack now, sir, but not with the bomb. Listen—we were able to get down close, and as you said, nothing happened. They wouldn't let anyone do that if they could stop it. Therefore, their weapon has a limitation. Maybe it needs too much power. Maybe it causes a disturbance that all Venus would detect. Or—maybe it doesn't work in air."

"What's that?" Crisp demanded.

"Remember, sir, it's only been used in space. If they don't use it here, it may be that it can only be used in space. When I thought of that, I wondered what else there was that could only be used in space. I remembered the old warp drive. But about the bomb, sir?"

"Very well." The captain turned to Anne. She gave the order through the intercom without leaving the room. Then she turned to Gladwin.

"You remembered the old warp drive," she murmured. "I thought you didn't know anything about spaceships, let alone their history?"

"I know the engines. I've always been a mechanic. There's not an engine, using any form of fuel, that I don't know something about. Anyway, remember the warp drive? You never saw it used, it's been obsolete for a long time now. But it only worked in space."

They frowned at him, Anne again looking very like her father.

"I know I don't think the usual way," Gladwin admitted cheerfully, "but it's the only way I can explain this—tell you how I thought of it. You know the tradition about flying in line?"

"Naturally," said the captain. "But that's just an old tradition."

Gladwin grinned. "I never thought there would come a time when I'd point out that there's always something behind every tradition," he said. "I think if you investigated, you'd find that tradition dated from the time of the warp drive."

The captain was lost, and beginning to get impatient. But Gladwin went on:

"When I got the idea, I looked back in the records in the library to see if there was anything to support it. There was, a little. A naval vessel rammed another once, by accident, and everyone in the vessel that it struck died. Curious, since it wasn't much of a crash. There is some record of an investigation, but not what it revealed. Since the Wreckers' weapon is known only to them, I'd say it revealed nothing and was forgotten. But the tradition remained. It wasn't safe to get into a warp area in front of another ship."

"You mean," exclaimed Anne, "that the warp itself is the weapon? That an extended field would kill everyone as the Wreckers do?"

"I do."

"But—proof!" exploded Crisp. "Is this just a piece of imagination? You think it might be so, so you say it probably is?"

"Exactly," Gladwin admitted. "Can anyone else do any better? Anyway, if you want proof, you can have it. I've tried it out."

"Oh." The captain became excited. "That's different. Why didn't you say so? You've tested a warp field?"

"I killed a couple of mice with a warp field two inches by three by three."

"Then we can use the Wreckers' own weapon against them?"

"No. It only works in space, and there's a lot of thick Venusian air about. I had to depressurize the first mouse, put a bag over its head and put it in a vacuum. But it wasn't the vacuum that killed it, it was the warp field."

"But the passengers on ships attacked by the Wreckers weren't in a vacuum," Anne objected.

"No. Hence the second mouse. I put him in a little cylinder and put it in the vacuum. When the field closed round the cylinder, the mouse died. You know what the warp is? Basically, it enables a ship to suck itself through space. The drive makes a warp in space in front of the ship, a warp that has to be filled up pretty damn quick. What is it? Nothing. Absolutely nothing. The warp is to space as space is to air. Space, which is nothing, has to fill up the warp, through which no electrical impulses can pass, and in which, we now know, nothing can live, even for an instant. The warp and space are two different kinds of nothing. Maybe there are a lot more."

"But why wasn't this known?" Anne demanded.

"How should I know? No one ever succeeded in projecting the field further than the thirty yards the ships used as a warp. That seemed to be the natural limit. So it wasn't much of a weapon, since it could only be used in space, was only effective if it surrounded an object, and could only be extended for thirty yards. But the Wreckers must have found out how to extend it for miles."

He concluded: "All that matters now is that the Wreckers can't use it on us so long as we stay low. It has nothing to do with the plan I suggest, which is this."

They didn't listen quietly. Sometimes they agreed, sometimes disagreed violently. But in the end they were satisfied on one point. If Gladwin's plan didn't work, they knew nothing else that would.

From the direction of New Paris a helicopter was racing nowhere in particular. Presently it turned in a wide circle.

Flying it, Gladwin wondered, now that it was too late, if there had been a better plan. He didn't like this one. It wasn't so much a plan as a wild guess.

Would the Wreckers be curious enough? Would they wonder what had made one machine, following a course so erratic, and yet so regularly erratic, come close to a base which might have remained undiscovered for years?

Or would they be coldly reasonable, destroy it and forget all about it?

That was item one. Gladwin raced on again and went into another wide circle, making a pattern in the sky. By now they must be watching him. He wondered when they would see that his pattern would bring him in sight of their base, and whether they would take action before it did.

They didn't. They waited until he saw the cave and whirled in the air to have a good look. He looked into the base—a vast cave hewn from the mountain. He counted seven ships, and exulted. This wasn't *one* of the Wreckers' bases—it was *the* base, and whatever happened, they weren't going to use it much longer.

But the Wreckers had lost bases before and it made no difference to them. They were prepared, apparently, to go on making and losing bases, one every six months or so. No, there was no victory in finding the base. It should have been found long before now.

Something caught the helicopter and shook it like a rat. Gladwin knew he was in the grip of the tractor beam, and any moment the helicopter would be dragged into a cave or

torn apart in the air. But it was a relief that it was only a tractor beam. He could go too low for that.

He dropped, and the shaking stopped. The Wreckers had no intention of allowing their tractor installation to be torn to pieces by focussing it on a mountain or a forest.

But Gladwin had been too long in the beam and dropped too swiftly. The helicopter would have landed safely if the ground had been ten feet lower. As it was he wrecked the machine.

Gladwin was unhurt. He knew how to crash a machine. He had been flying helicopters for a long time, if not naval models. He was out at once and running.

It wasn't his exertions which made him sweat. It was the knowledge that he might die at any moment in any one of a hundred different ways—and there was no reason why he shouldn't, except his trust in chance.

He shot a glance behind him and saw men streaming from the Wreckers' base. So far, so good.

Then came part two. As the Wreckers streamed out into the open, the *Arachnid* shot into view from nowhere, guns blazing. Scores of men died before they could take cover. Others, trying to run back to the base, made about ten yards and then crumpled.

Gladwin realized his personal danger was almost over. He dropped behind a vast root of a Venusian molan tree and watched. He was only about three hundred yards from the Wreckers' base. The *Arachnid* was boring in at it now, all her armament in action.

But a ship can either attack or defend—not both. The *Arachnid's* screens were down to let her own barrage through. And the screens of the base were holding. There was no reply—yet.

Suddenly the Wreckers' defence ended. They blazed into attack. For two minutes that seemed like hours the ship and the base in the mountain slung everything they had at each other. One of the ships in the cavern became incandescent and then subsided, as if it were made of melting ice. The naval vessel was hovering only fifty feet from the ground, pouring everything she had into the cavern.

But if the *Arachnid* had vast power for her weight, the Wreckers didn't have to bother about weight. There was only one outcome. And as if the *Arachnid* realized it, she suddenly darted forward at the cavern, ready to ram it if all else failed.

It only gave the Wreckers a better chance to throw everything they had at her. The dark hull glowed crimson suddenly, then white. And the *Arachnid* crashed just outside the cavern, the white hull changing to orange, then fiery red.

The Wreckers had a plan worked out to the last detail. No time was wasted on the *Arachnid*. No one went near the fallen ship. Even if the men inside weren't dead, they were harmless until the fused hull cooled and they could cut their way out. That would take at least five hours. The Wreckers knew that, and they were right.

Inside the cavern the Wreckers were trooping into the six remaining ships. It was all orderly and systematic, and it went beautifully. There must have been over a thousand of them, but within twenty minutes the ships were ready to take off. The first began to edge past the dead *Arachnid*.

Then the real attack came.

Gladwin had known that the *Arachnid* could do nothing against the Wreckers in their base, except force them to leave it. But now the big tractors and energy beams and sound-shield projectors lay dead about the floor of the cavern, hastily destroyed by the escaping Wreckers. They had only the normal armament of six ships—and six ships, moreover, which were on ground, not their natural element.

The Wreckers must have been surprised at such an attack by one ship. But with their espionage system as it was, it had had to be one ship or nothing.

The *Arachnid* had been a beautiful ship. One man could control it. It had not needed many men to make the ferocious attack that ended with the ship lying helpless before the Wreckers' base. The rest, and all the ship's portable armament, had been landed long before.

The fire came from Gladwin's right. The Wreckers, now that it was obvious that a planned attack had been made,

should have known better than to try to escape to the left, past the wrecked battleship.

Defence is never far behind attack in the development of new techniques. The sound shield was so complete an answer to the use of atomic power that it was only effective as a surprise attack. Atomic power wasn't used now.

But if the course of any moving object can be predicted, a pretty hot barrage can be arranged. The men from the *Arachnid* had known exactly where the first vessel would go. It was no wonder it dropped in a blaze like that of the naval ship itself, and only a few score yards from it. What had hit it was a beam which would have done no harm in a second, or ten seconds, but which must inevitably turn it to incandescence if it could be held for a full minute. That beam had finished the *Arachnid*, used by the Wreckers, and used by the men from the *Arachnid* it finished the second Wrecker ship.

Then the Wreckers realized the purpose of the fire from the right. It was partly to direct their route of escape. But its main purpose was to bring the roof of the cavern down. There was the first sign of panic in the ranks of the Wreckers. Two ships tried to rise together and too rapidly, and crashed into each other. That helped, Gladwin thought. Not so much because the two ships were damaged, but because their fall must have weakened the structure of the cavern.

Rocks began to fall. The disadvantage of the tractor was that it could only pull slightly less than its own weight at best. Therefore, heavy as the units from the *Arachnid* were, they could focus only weak beams on the roof of the cavern. But only weak beams were needed.

Another ship rose, still inside the cavern, and almost made its escape. But it lingered too long. Six energy beams fastened on it and held it. It needed time, and it had to stab back with its own weapons. This entailed dropping the shield. It had time for one wild attack on the men on the ground—an attack which would have finished them if it had been properly directed.

But when the first attack failed, it had time for no more. It became the third ship to blaze and drop to the ground.

The crash of that ship must have done it. Great blocks of rock began to fall. Then, it seemed, half of the mountain dropped. The tractors were off now. The cataclysm, properly started, gathered momentum.

The Wreckers' base was buried. But the mountain took a long time to settled. The navy men did nothing to help it. It was impossible to take chances with the Wreckers. Later someone would ask why they took no prisoners. But not now.

It took Gladwin and the two parties only ten minutes to cut a section out of the *Arachnid's* hull. He counted the men who came out—nine, ten, eleven. Only two missing, left where they fell. Had they beaten the Wreckers with only two casualties?

Not yet. There were at least two hundred men alive in the other ship, only a few yards away, and it was anybody's guess how many remained in the mountain. They couldn't take chances.

It was as inhuman, really, as anything the Wreckers had ever done themselves. If the Wreckers had not had such a reputation of invicibility, perhaps the crew of the *Arachnid* would have taken prisoners.

As it was, they planted a bomb in the rubble of the mountain and made for New Paris. There would be no sound shield operating now.

They could only have been ten miles away, two hours later, when the world rocked . . .

"There will be the devil to pay over that," Captain Crisp gasped. "What it must have done in New Paris and Media . . ."

"Think of what it must have done to what was left of the Wreckers," said Gladwin, and remembered, very late, to add "sir." "Besides," he went on, "you were going to drop a bomb anyway, sir, weren't you?"

The world was beginning to settle a little. The party from the *Arachnid* had taken a course to place two hills between themselves and the explosion. They could only have an idea of the devastation they had left behind them. But they knew there couldn't be much left of Mount Philippa—and nothing at all of the Wreckers.

Crisp surveyed Gladwin thoughtfully. "I expect they'll make you an admiral," he remarked.

"How do you do it, Gladwin? Is it blind luck?"

Gladwin grinned. "Just trust in tradition, sir," he said.

Anne, who was just ahead of them, jumped spasmodically at that. She wasn't neat now. She was grimy and hot. She had been in charge of the party operating the tractors, and it had been heavy work and a man's job.

"Tradition!" she exclaimed.

Crisp grunted and went on, leaving them to fight it out. The word seemed to be the keyword in a private battle, and his authority, as far as Gladwin was concerned, seemed to have been weakened enough already.

"Sure," said Gladwin. "Curiosity is traditional. When the wreckers destroyed the helicopter and I started to run, they should have shot me. But no—they were curious. They had to take me prisoner and question me. So they let their screen down and ran out to capture me. I didn't take much of a chance. I knew they would. 'Take him alive' is a tradition. That gave the *Arachnid* its opportunity. Then when they were escaping, they destroyed their defences. Traditional again. Never leave anything for the enemy—even if he has plenty himself and it doesn't matter a damn. So they couldn't come out of their ships and hold us off again. Then——"

"All right, save the rest. I still wonder if you're lucky or brilliant."

"A bit of both, I expect," said Gladwin modestly. "There's another tradition . . ."

"Yes?"

"After an affair like this, it would be in the best traditions if you and I got married."

"I don't think," said Anne sarcastically, "that I'm in your class, Gladwin. You'd be marrying beneath you. I'll be a lieutenant for a while yet, and as Captain Crisp says you'll be an admiral in no time, or less."

"Well, at least," said Gladwin mildly, "tradition demands that you kiss me and call me Alan."

"That doesn't strike me as impossible," said Anne.

Two minutes later she murmured: "I wonder why some people always get what they want, Sub-lieutenant Gladwin?"

Book Reviews

FICTION

THE CITY AND THE STARS,
by Arthur C. Clarke, published by
Frederick Muller Ltd., 110 Fleet
Street, London, E.C.4, at 13s. 6d.,
is the latest science fiction novel
by this well-known writer.



It the story of Alvin, the Unique, who lives in the city of Diaspar at a time far in the future. Diaspar has shielded humanity for countless years, providing everything they need, up to and including a form of immortality, by a process of mechanical reincarnation, and is, in effect, a mechanical paradise. Conditioning from the Central Computer has caused the inhabitants to show no curiosity as to things outside the city and they are tied to the city by an ancestral fear of legendary enemies who purportedly had driven man back to his native planet from his place among the stars.

Alvin, being a Unique, has had no previous existence and so no memories of previous lives in the city. He is a mal-content, restless and eager to explore. He manages to leave the city and makes his way to Lys, a rural community of telepaths, where he learns more of the history of man. Then back to Diaspar again and off on another journey; his incomprehensible urge to explore having strange repercussions on the city and those within it.

The book is extremely well written, even though, at times, it appears somewhat over-written and is a complete revision

of an earlier story, *Against the Fall of Night*, which appeared many years ago.

There is a truly immense breadth of imagination as the journeyings of Alvin unravel more and more of the mystery surrounding the city of Diaspar. The author, in effect, is, by the medium of his characters, giving the reader a quiet, calm, unhurried and explicit account of a segment of the distant future and is to be commended for having produced a book which will gain much literary praise.

ESCAPEMENT, by Charles Eric Maine, published by Hodder and Stoughton Ltd., at 12s. 6d., is a scientific thriller set a few years in the future.

John Maxwell invents a brain-impulse recorder which allows any listener to enter the thoughts of the subject, his motives being the laudable one of wishing to further the treatment of the mentally unstable. However, the villain, Paul Zakon, sees in the discovery a new means of entertainment and there is much skull-duggery as his thugs, girl friends and others gain control of the discovery from the inventor.

John, who suffers from a peculiar disability in that he cannot enjoy normal sleep, finally revolts, cuts loose with a gun, falls from a window and receives a head injury which, coupled with his previous disability, puts him to sleep for nine years. He wakes to find that Zakon has installed Dream Palaces everywhere, and that the cult of *Unlife*, dreaming while enjoying mental recordings, has apparently come to stay.

To betray the end of the story would be to rob the reader of enjoyment, for, like all thrillers, the sting is in the tail.

NON-FICTION

THE POWER OF THE MIND, by Rolf Alexander, M.D., published by T. Werner Laurie Ltd., 1 Doughty Street, London, W.C.1, at 18s., is a text book on Creative Realism.

Creative Realism is the name given by the author to a philosophy which has as its aim the removing of subconscious

interference so as to achieve a new outlook on life; one that is free of fear, unhappiness, self-doubt, etc. Proof that this can be accomplished with startling results is the fact that the author gave a series of demonstrations of his power by dissolving cumulous clouds by the effort of his will. Photographic evidence of these demonstrations are included in the book.

Also included are lessons the following of which, it is claimed, will enable the reader to gain new awareness, a more efficient mind and the power to dissolve clouds for himself. An achievement which could have certain advantages. The lessons, however, are disappointing in that they are so few and all boil down to our old friend autohypnotism, and are buried within a comprehensive coverage of a host of subjects few of which seem to have any real bearing on the philosophy itself.

There is little doubt that the author actually did dissolve the clouds as claimed and it is a pity that, in this book, he has tried to do too much. The lessons would have gained by greater detail and elaboration, instead of being, as they are, tucked away at the bottom of a few chapters almost as if they were an afterthought.

But perhaps that was deliberate, for, as the author warns, it will take at least five more books to fully unfold the theory of Creative Realism and doubtless there will be more lessons.

THE REDEMPTION OF THINKING, by Rudolf Steiner, published by Hodder and Stoughton Ltd., St. Paul's House, Warwick Square, London, E.C.4, at 12s. 6d., is a study in the philosophy of Thomas Aquinas.

In this book, Steiner links his spiritual science with the history of European thought and shows that in the thirteenth century it attained brilliance through Thomas Aquinas who reconciled philosophical knowledge and Christian revelation. Philosophy is important because the extension of scientific methods of thought has led to a division between science, religion and art. Only by a redemption of thinking can we understand and close those divisions.

Discussions

LITERARY LINE-UP

I'm glad now that I sent in a subscription for *Authentic* as I received the mag much earlier than it appears in the shops.

To begin with, I must congratulate you on another splendid cover on No. 70; it was equally as good as last month's. Both the articles were extremely interesting, especially *The Martian Enigma*.

I vote the novel, *The Big Secret*, as the leading story this month, followed a close second by the novelette, *Let Me Live In A House*, which had a very unusual plot yet a very entertaining flavour.

Among the shorts, *Logical Elimination* and *Pilgrims All* were both excellent stories, written by two authors who should make good names for themselves in the future of science fiction. *Lunar Bridge* was a story with a twist on a scientific discovery and made good reading. *The Hidden Power* and *Like A Diamond* deserved third place. These, Alice Beecham's and Philip Stratford's third stories in *Authentic*, prove to be equally as good as their other two. Last, but not least, Veronica Welwood's *The Wilder Talents* which was a fairly good story even though so short.

P. Buckle, 9 Landseer View,
Bramley, Leeds 13, Yorks.

Subscriptions help both you and us. It costs no more, and you are certain of getting the magazine without bother and without delay.

ERROR?

I've been a regular reader of *Authentic* since about the 29th issue and have intended to write to you for a long time but have always put it off. However, something in *Book Reviews*, No. 68, has, at last, compelled me to get on with the job.

In your review of *The Men Behind the Space Rockets* mention is made of Herman Oberth. Now, here comes the "clanger." You state that he is *now in America!* Tut-tut, I remember reading in 1936 or 1937 that Herman Oberth was killed in the late twenties as he bent down to examine the exhaust of a rocket racing car. Of course, I might be mistaken, but it would be best if the matter were cleared up, don't you think?

Having got that off my chest I can continue.

The mag can be divided for purposes of comment and criticism into: cover, stories, articles, departments, etc.

The cover. Well, nicely coloured but why stick a man on it so often? And, surely, your artist can design a more futuristic spaceship than that shown on the cover of No. 70? Talk about Heath-Robinson! It looks as though it would blow itself up, let alone take off.

The stories. Well, the last half dozen or so issues have shown a marked improvement, so keep up the good work. Not too many

short-shorts, though; keep the stories as long as possible. Personally, I think that the best story which has appeared in *Authentic* is *The Mutilants*, No. 47. It must be good for me to remember. Boy, was that story gruesome! I thought that I was a "hardened case," but that story made me shudder and brought me to the brink of the screaming heebie-jeebies. I'd like more of that type but, alas, apparently your other readers don't.

Your articles can only be described as excellent and authoritative, the series *The Way to the Planets* being easily the best. Now, how about following it up with a series *The Way to the Stars*?

The book reviews are made to sound so attractive that I'm sorry that I'm not a wealthy man of leisure, so that I could buy and read them all.

Summing up, the mag is a grand two-bob's worth, and worth the price. I'm sure you're not making a fortune. As I said: more futuristic covers, longer stories and *Authentic* will be well-nigh perfect. Incidentally, if this sees print, I'd like to hear from science fiction fans in Canada.

Harry Holway, 35 Lupus Street,
London, S.W.1.

Someone's made an error, but who? Perhaps you are thinking of Max Valier, who did much work with rocket-driven cars and died in 1930 from injuries received during a test firing? The rocket ship on the cover of No. 70 looked the way it did because it

had crashed. Thanks for the suggestion as to a new series. I hope you like our present one.

CONTRADICTION

There seems to be some contradiction in Mr. Cottrell's letter in issue No. 68. Attempts at space travel will, he thinks, be first made by individual countries, and then adds that this would not come about "until we have a stable World Government." I cannot agree with this, because World Government and individual states are mutually exclusive.

It is my opinion that space travel is a minority interest and, while it remains so, the only hope of its expression in action beyond that already being done, is through the initiative of decentralised autonomous groups or, possibly, the co-operation of minority interests in sovereign states. World government would, I think, effectively prevent its realisation.

R. Carrier, 124 Oxford Street,
Sydney, Australia.

It seems to be true that the more government the less flexibility. But how small a group, or group of groups, can we have that would still be able to afford the fantastic cost of space flight investigations? Unity makes for financial strength, but it can also lead to a diluting of enthusiasm. And without enthusiasm space will never be conquered.

COMMENT

A few words of comment about the story-content of Nos. 69 and 70. First of all I consider them

altogether way above their immediate predecessors. No. 69 is rather overbalanced. The stories, though better as stories than the shorts in No. 70, nearly all have a sad or morbid ending. I don't like this sort of story at all—but even so, there's surely no need to crowd so many of them into one issue?

Mowgli calls for special comment. John Brunner has realised the great fallacy of child-reared-by-beasts stories—even though this does not detract a whit from my enjoyment of them as stories. Whenever a case occurs of a child being found among wild animals, there's always some interfering busybody with misplaced good intentions who "rescues" the child and attempts to civilize and educate it. Without much effect, because it soon dies. It has always struck me that such "rescuers" should, by rights, have to answer to the R.S.P.C.A. Anyway, it would seem that, by itself, a brain is nothing but a survival-mechanism—and latent intelligence needs to be sharpened on equivalent intelligences around it for it to become manifest. And if it goes too long without sharpening it just atrophies.

The stories in No. 70 are, on the whole, of less high quality than No. 69, except for the novel, *The Big Secret*, which is a pretty good story from all angles. I like it.

While I'm at it, the restriction of the articles to a pair makes them stand out, and I find them quite interesting reading. There is also your editorial in No. 69 which I found more interesting still. No doubt scientific types will find your reasoning full of flaws. If so, I hope you print their

reactions. Because I can't see any.

A. Mercer, 434/4 Newark Road,
North Hykeham, Lincoln.

As a survival mechanism the brain is extremely efficient, agreed, but how do we define intelligence? Isn't it the ability to survive? It seems rather pointless for someone to be able to do calculus—and yet not be able to feed himself. But what of a child reared by beasts? Such a person would suffer from a continual inferiority complex because he would be trying to emulate, say, a wolf, without having the physical equipment to do it. No matter what he tried to do, he couldn't equal or beat them at their own game. But it shows the surprising adaptability of humans that they can, given the right circumstances, survive as a beast among beasts.

NICE TO HEAR

I have been a reader of science fiction for about five years now, but I've never bothered with a regular subscription to any science fiction magazine until recently, because I never found one that was consistently good, interesting SF. But I now have a subscription with *Authentic* because it is consistently good, interesting SF.

Of course, I don't like all the stories or all the features, but I can read my copy each month, and know that I shall find at least ninety per cent. of it to my liking.

Please accept my thanks and congratulations on producing a very good magazine.

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R.N.A.S., Abbotsinch,
Paisley, Renfrewshire.

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